

In This Issue—Getting Your Story Across

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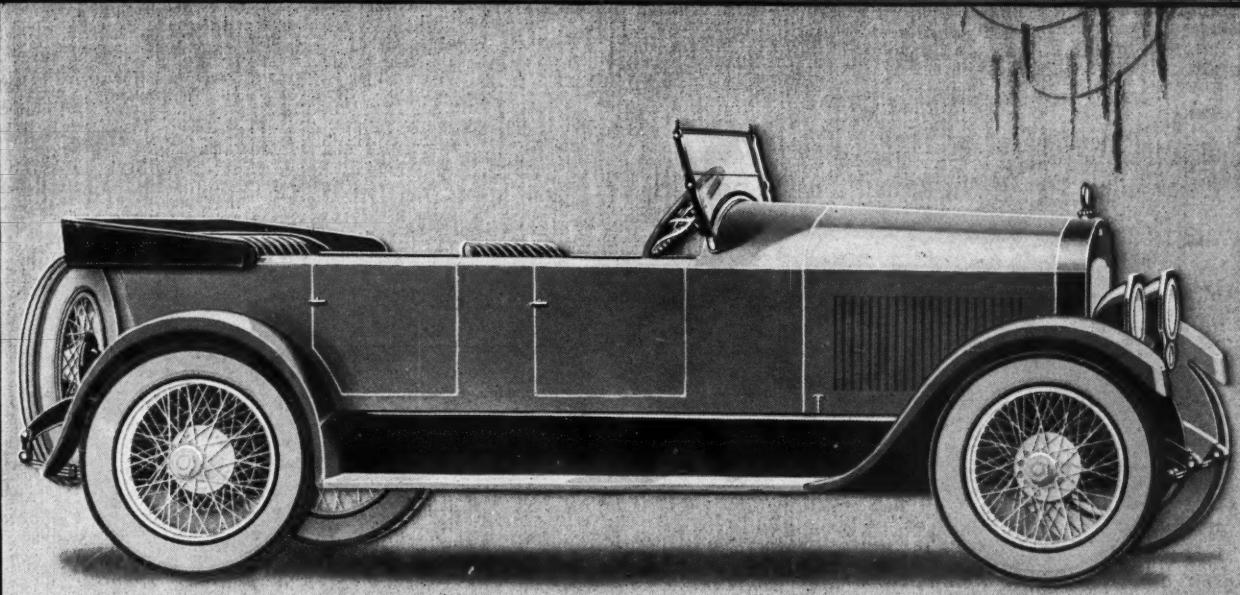
MOTOR AGE

Volume XXXVII
Number 24

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, JUNE 10, 1920

Thirty-five Cents a Copy
Five Dollars a Year

THERE'S A TOUCH OF TOMORROW IN ALL COLE DOES TODAY



Sportster

Cole Aero-EIGHT



Those whose experience has taught them to recognize intrinsic worth are quick to appreciate the significant value of the Cole Aero-EIGHT. Consequently you

find that Cole dealers everywhere number among their patrons the most discriminating owners of motor cars in their communities—those accustomed to the best.

COLE MOTOR CAR COMPANY, INDIANAPOLIS, U.S.A.
Creators of Advanced Motor Cars

JOHNSON'S CARBON REMOVER



in

YOU can keep your motor snappy and full of "pep" by *preventing* the accumulation of carbon.

Don't wait until your engine is choked and caked with it.

Use Johnson's Carbon Remover every 500 miles, then the carbon is removed while it is soft and powdery, eliminating the frequent grinding of valves and *keeping* the motor *always* clean. No experience or labor required—you can easily do it yourself in ten minutes—and the cost is trifling.

Easy — Clean — Safe — Quick

Johnson's Carbon Remover is the easiest, cleanest, safest and most satisfactory remedy for carbon. It will save you from \$3.00 to \$5.00 over any other method without laying up the car. A dose of Johnson's Carbon Remover, the engine laxative, will stop that knock—quiet your motor—save your batteries and reduce your gasoline consumption 12% to 25%.

Keep Your Car Young with Johnson's Car Savers

Start today to reduce the depreciation of your automobile. An hour or two every month and JOHNSON'S CAR SAVERS will prove their value in dollars and cents when you come to sell or turn in your car.

Johnson's Radiator Cement—liquid.

Johnson's Stop-Squeak Oil—a wonderful spring lubricant.

Johnson's Valve Grinding Compound—gives a velvet seat.

Johnson's Cleaner and Prepared Wax—make body, hood and fenders look like new.

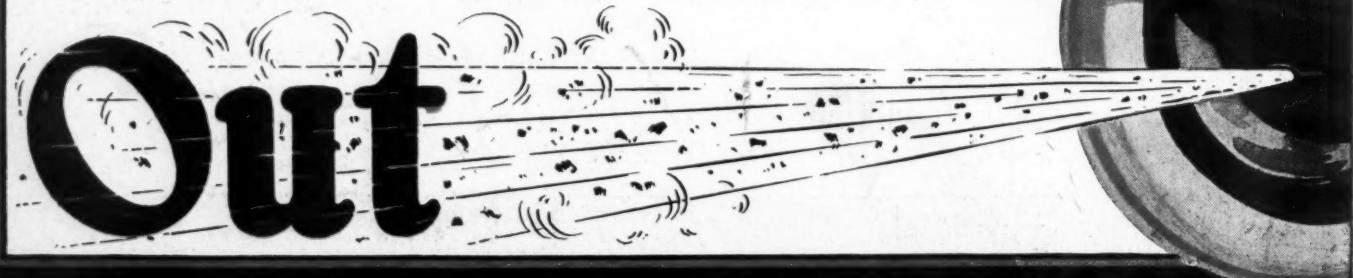
Johnson's Black-Lac—the perfect top dressing.

Johnson's Auto-Lak—a splendid one coat body varnish.

Johnson's Hasteen Patch—can be applied in two minutes.

Write for our folder on "Keeping Cars Young"—it's free.

S. C. JOHNSON & SON Dept. MA 6 Racine, Wis., U. S. A.



MOTOR AGE

Published Every Thursday by

THE CLASS JOURNAL COMPANY

MALLERS BUILDING
59 East Madison Street, CHICAGO

HORACE M. SWETLAND, Pres. W. I. RALPH, Vice-Pres.
E. M. COREY, Treas. A. B. SWETLAND, Gen. Mgr.
Member Audit Bureau of Circulations; Member Assoc. Business Papers, Inc.

Vol. XXXVII June 10, 1920

No. 24

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MOTOR AGE

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BRANCH OFFICES

DETROIT, 95 Fort St., W., Phone Maine 1351
CLEVELAND, 536-540 Guardian Bldg., Main 6432
NEW YORK CITY, U. P. C. Bldg., 239 W. 39th St.

Phone Bryant 8760

PHILADELPHIA, Widener Bldg., Phone Locust 342-343

SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$ 5.00 per year
Canada.....	7.00 per year
All Other Countries in Postal Union.....	10.00 per year
Single Copies.....	35 cents

Make Checks Payable to Motor Age

Entered as second-class matter, September 19, 1899, at the Post Office, Chicago, Illinois, under Act of March 3, 1879.
Owned by UNITED PUBLISHERS CORPORATION, 239 W. 39th St., New York, H. W. Swetland, Pres.; Charles S. Phillips, Vice-Pres.; W. H. Taylor, Treas.; A. C. Pearson, Sec.



"NORMA"

PRECISION BALL BEARINGS

(PATENTED)

It is easy to claim precision. It is another matter to maintain it, in quantity production. That "NORMA" Precision is a fact is demonstrated by the daily performance of hundreds of thousands of high-grade magnetos and lighting generators in which "NORMA" Bearings are standard. It is this sustained precision which explains "NORMA" silence and serviceability at high speeds.

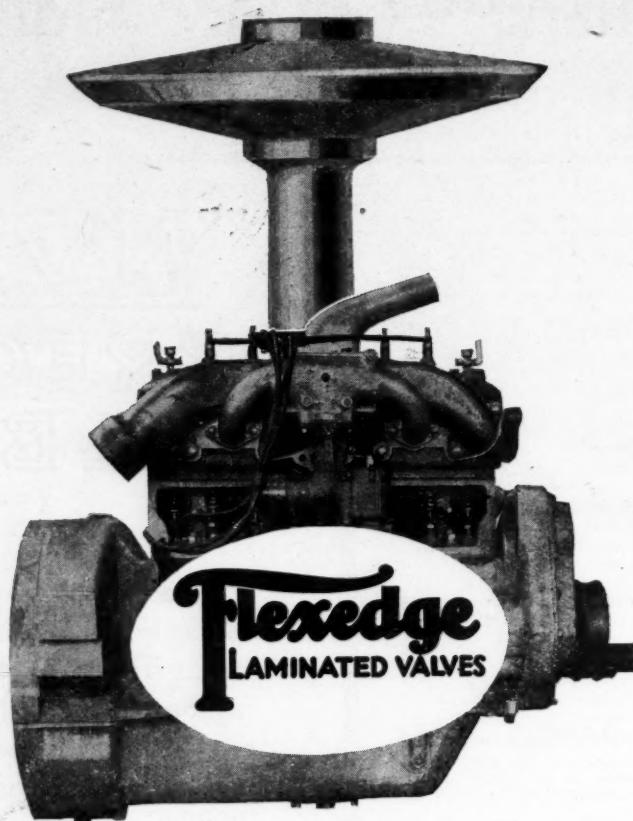
See That Your
Electrical Apparatus
is "NORMA" Equipped

THE NORMA COMPANY OF AMERICA

Anable Avenue
Long Island City
New York



Ball, Roller, Thrust and Combination Bearings



They Don't Pit, Warp, Crack, Leak, Nor Need Regrinding

Indianapolis Speedway
500 Mile Sweepstakes
May 31, 1920

MONROE WINS!

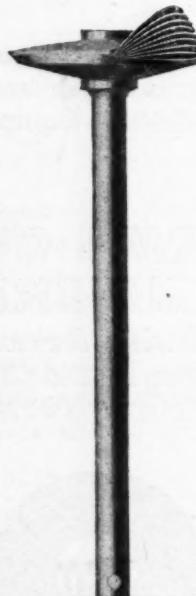
Monroe was the first American car to standardize **Flexedge** valves for stock equipment.

The brilliant De Palma, leading by two laps in the 467th mile, was—defeated by engine trouble.

What is engine trouble? Gamble your last dollar that it is valves. The gamble is 75% sure, no matter whether the motor is automobile, airplane, or tractor.

Flexedge valves are proof against trouble. Both the manufacturer and owner need **Flexedge** valves.

Your customers demand them.



Sectioned to Show Construction

SELF-SEATING VALVE COMPANY

706 Townsend St., Chicago

MOTOR AGE

Getting Your Story Across

by *Lambert G. Sullivan*

LET people know what you have to sell! Let them know that what you have to sell is just a little bit better than any similar article that they can get anywhere else. In brief,

ADVERTISE!

That may sound rather familiar to some of our readers. It may sound suspiciously like what the advertising solicitor tells them when he drops in. But don't fear. This article is not to be a disquisition on advertising. It is merely the tale of two new forms of advertising and publicity work which have sprung into prominence in the last winter. They are the advertising of Service and the use of display space in advertising used, rebuilt motor cars.

The average automobile dealer of the present is not selling cars. One of the largest distributors in the country told the writer recently that so far as just selling cars was concerned, it would be foolish for him to pay salaries to salesmen. If just getting rid of cars were his only necessity, all he needed would be a couple of order takers. He kept on with high-priced salesmen simply because he was building for the future, because he wanted to have some real salesmen when there was some real sales resistance. And he was keeping his best salesmen keen and out of the rut of carelessness and indifference by having them sell Service or used cars.

Advertising Your Best Salesman

Advertising is any dealer's best—and highest priced—salesman. No dealer would think of employing his best salesman to take care of a "prospect" who was so far sold as to be a sure thing, even for an order taker. Why, then, do the vast majority of dealers continue to employ advertising, their highest priced salesman, in disposing of an article which is ready for an order taker?

Many dealers in all parts of the United States apparently have been asking



themselves the same question. They have come to the conclusion that it is a waste of money and energy to do so, and had "set" their star salesman on a brand new prospect, a prospect who has the reputation of being a regular hard-boiled proposition, a mighty tough sort of fellow. They have put their best salesman to work selling Service.

Some typical advertisements of Service which have recently appeared in American newspapers are reproduced in this week's issue of MOTOR AGE. They range all the way from the factory ad calling attention to the careful supervision given by the factory to dealers' Service to a series of dealers' ads calling attention to his own particularly good Service. They make the public know that selling Service is just as much a part of the automobile maker's and automobile dealer's business as selling new cars.

And in addition to their direct benefits, they are extremely efficacious in combating an extremely vicious propaganda which automobile men have permitted to grow up about one important

part of their business—the repair department. Perhaps no industry in the world has ever had the propaganda directed against it that the automobile business has had, and it is certain that no industry has ever been so successful in combating that species of artificial sales resistance.

Will Combat Inimical Propaganda

There are few of us associated with the automobile business who do not remember the unkind things which were said about it in its infancy. All of us recall the so-called joke picture in which a motorist was depicted prostrate under his car on a country road, while another man drove past him in a horse-drawn buggy, both horse and man wearing wide grins. That picture was of such frequent recurrence that the publishers of the humorous magazines might have saved no inconsiderable sums in artists' fees by having a rubber stamp made for it. It used to appear on an average of twice or three times a week in every newspaper in the United States.

That sort of thing might eventually have been a mighty bad thing for the

automobile industry had it been allowed to continue uncombated. But automobile manufacturers combated the influence of the stock jokes about automobiles by bringing to the attention the truth about motor cars.

In a word, they advertised.

The jokes appeared two or three times a week. But the advertisements, telling the truth about motor cars, appeared daily and in five or six places in the paper. And naturally, people began to believe in the automobile. They began to discount the automobile jokes for just what they were—jokes. The mere preponderance of the space occupied by stories telling the truth about cars—for advertisements, after all, are merely your story—successfully combated the joke-propaganda.

"Jokes" Hurt the Service Man

There is a similar vicious propaganda in existence to-day in regard to the important Service department of the dealer's business. It takes the form of humorous comment or illustration regarding the enormous repair bills sent out by the service station or by the extreme inefficiency of the average service man's work. You see it in your own daily paper two or three times a week or oftener.

So far, dealers have made little effort to combat that propaganda. They may wax indignant at the alleged "jokes"

The tightening of credits isn't going to hurt this dealer much. He knows that foodstuffs are always going to have a market and is just as willing to take them as the actual cash

Used Automobiles

WILL take hay, potatoes, corn or any produce you have. This is an opportunity every farmer has been looking for.

No farmer can afford to be without an automobile. What is the use of paying out money when your produce will do as well? We are not selling for profit but to clean up a large stock of automobiles taken in trade on new cars.

Every car guaranteed as represented.

The H. B. Loveland Company

LIBERTY DISTRIBUTORS

643-645 Main Street, Buffalo, N. Y.

and fervently declare that they are distortions. The automobile editor of one of the largest newspapers in the United States which has run a series of really humorous automobile cartoons, many of them "slams" at the repair man, tells me that not a week goes by that he doesn't get indignant letters from dealers denouncing these cartoons as being

utterly without any foundation in fact and usually concluding with threats to cancel advertising contracts.

Cancelling contracts wasn't the way the automobile manufacturers overcame their early sales resistance. The toughest thing in the world to threaten—unless it be a traffic policeman—is a newspaper. Scaring a reputable newspaper—and you don't have to worry about the other kind, for they don't amount to anything—by threats of cancelling advertising contracts, just can't be done.

Courtesy Brings Courtesy in Return

The manufacturers in the early days didn't make that mistake. They beat the propaganda by making themselves such good customers of the newspaper that any plea or request they made was at least given courteous attention. Of course, they didn't always get everything they wanted, but just the same they never made a request which wasn't thoroughly considered before it was refused.

They learned that it was easier to conciliate than to browbeat. More vulgarly, they learned that Bull is a much more valuable weapon of defense than brickbats. An example of how courteously pleas of automobile manufacturers are considered came about three or four years ago. The National Automobile Chamber of Commerce sent a simple request to every newspaper in the United States to eliminate the expression "pleasure car" and substitute "passenger car." And to-day there are only a few scattered papers which refer to automobiles as "pleasure cars."

The same thing can be done with the Service business. That the present propaganda has been allowed to grow up is no fault of the newspapers. They run it because in the beginning it had a grain of truth in it and because their readers seemed to enjoy it. They rightfully feel that if the automobile men don't consider their service business important enough to advertise it, the newspapers can't be expected to take it very seriously either.

TO THE AUTOMOBILE THIEF

Who stole a new Marmon 34 Four-Passenger Touring Car from in front of our Salesroom at 1044-46 Gilbert Avenue, Wednesday p. m., February 11th.

YOU will, no doubt, appreciate the new High-Efficiency Motor, which literally taps what before were unknown reservoirs of power. In this respect it is as amazingly advanced as was the original design of the Marmon 34 when it introduced light-weight motor car design as a model for the world to follow.

You will find that in acceleration and flexibility it offers a new type of fluid power and one that will add greatly to your ease and comfort.

You will particularly appreciate its quick acceleration (from 10 to 50 miles per hour in 16 seconds).

You, perhaps, do not know that the manufacturers of the Marmon 34 were given the title of Champion Liberty Motor Builders by the Government and that they were the only

motor car builders commissioned to build two entirely different types of airplane motors during the war. As a result of this great experience the Marmon organization is able to produce a motor car engine of entirely new powers and ability.

Because of its unexcelled riding ease and ability to cover more miles per day with more economy and less effort than comparable cars you will be in a position to outdistance any possible trailing sleuths.

While we naturally do not uphold the crime that you have committed, your judgment in the selection of a motor car is on a par with that of noted engineers, financiers, and men and women of prominence throughout the country.

Should you require service, you will find us equipped to take care of your every demand. You will be welcomed to this

HOUSE OF SERVICE

The Franklin Motor Car Company

ROBERT H. WHEAT, President

1044 GILBERT AVENUE

CINCINNATI, OHIO

CANAL 1826

Windell Motor Car Company, Portsmouth, Ohio.

MARMON 34

Here is how the Cincinnati distributor for the Marmon converted a serious loss into a real asset. Ability to localize one's advertising and make it truly "newsy" is just the difference between excellent and merely mediocre advertising

Packard

TODAY, more than ever before, the responsibility of the Motor Car Builder to the Customer begins with the delivery of the car.

In its new Service Building, under construction on Jefferson Avenue, the Detroit Branch of the Packard Motor Car Company is providing for the assumption of this responsibility in a more complete manner than has ever before been attempted in Michigan.

The aim of the Detroit Branch Management will be to render every Service which the owner of a Packard rightly should anticipate.

An individual section devoted to her especial needs is being provided for the woman who drives her own Packard.

The new building will open in May.

PACKARD MOTOR CAR COMPANY
DETROIT BRANCH

Don't, however, make the mistake of believing that any sort of service advertising will suffice. Service, to attain its due dignity, must be advertised as a commodity in itself. It is only by impressing upon car owners the importance—the necessity, indeed—of good service that the service department can be built up into a real paying business.

Frequently our readers have sent us clippings of so-called "service ads" to show that they were doing their part in building up the service branch of the retail trade. And, sad to relate, these very ads proved they were doing nothing of the sort. They were not advertising service at all. They were merely advertising new cars, with Service thrown in as a sort of premium; just as newspapers and magazines years ago used to offer a hall clock or a reading room lamp or a set of indestructible crockery as a premium with a year's subscription.

Your Factory May Assist You

To make service work dignified, to combat distrust of service work, you must dignify it. And you can't dignify it by offering it as a premium with some other commodity you are selling. Let your customers know that you are not merely in the business of selling cars; that you are in the retail automotive business and that that business includes the selling of service just as much as it does in selling cars.

Perhaps the Service Man who is also a dealer will say:

"Yes, I realize the need of service advertising, but how about the expense.

The Packard company is one of the first manufacturers to recognize the importance of service work. Here is an ad by the Detroit branch of the firm which recently appeared in the monthly magazine of the Detroit Automobile Club

My factory is willing to go 50-50 with me on new car advertising but I doubt if it will do so on service advertising."

Perhaps this is so and perhaps not. Some of the leading automobile manufacturers in the United States have already awakened to the importance of the service end of the industry and are doing service advertising of their own. It is almost a certainty that they would be willing to co-operate with their dealers in similar local advertising. It won't do you any harm to ask the advertising department of your factory if it is willing to help you out, at any rate. The worst you can get is a refusal and perhaps an offer of co-operation may come with a readiness which will astonish you.

150% Advertising Benefit

Even in the event of a refusal by the factory, however, this is no real reason for the abandonment of service advertising. If you aren't willing to advertise your own business, you ought not to be in it. When an automobile concern offers to pay half your advertising bills, it is doing so because it believes that it is getting 75 per cent of the benefit of that advertising. There is only one case in the writer's memory where the factory didn't get 75 per cent of the benefit—and even then it thought it was getting it.

That doesn't mean that the factory is making you pay too much. The dealer

of private callers, and as convivial even in
theaters, and as gay tho', we'll
be before Mr. Bryan
Mrs. W. C. T. U. slipped us the water cure.

P. S.—Anyhow, we'll all get together the night of April 15. And take it from Me an' Amby, we'll forget the woes of the world that night. Keep a thinkin' in' these dates—April 12—15. They should mean suthin' in your young life, pal.



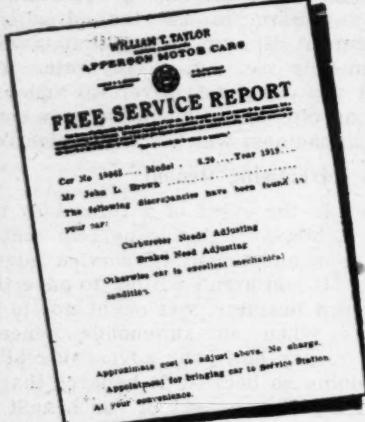
THE END

Here is some particularly clever advertising which is done in the circulars sent out by the Denver Dealers' Association

Announcement

We are reprinting this ad. because of the numerous requests from present and future Apperson owners.

M. T. Taylor.



Apperson Service is a Revelation

Those who become Apperson owners are impressed with the thoroughness and efficiency of Apperson Service. As one owner remarked recently, "Your monthly inspection service and the real interest you show makes the satisfaction of Apperson ownership 100% complete."

For example, when you need service, your car is personally inspected first by Mr. O. W. Hoffman, Service Manager. The service report is then filled out in triplicate, one copy of which is sent to the General Manager, where its contents are recorded in a permanent file. Another copy is then sent to you.

As a result of this method, we have a complete chronology of every Apperson car we sell. Should you want to sell or trade, we can tell you the exact mechanical condition and value of your car.

Ride in an Apperson First—Then Decide

WILLIAM T. TAYLOR

Eastern Distributor

Broad and Race Sts. Philadelphia
Mr. E. S. Edington will gladly explain and demonstrate the many superior points of the Apperson. Ask or phone him. Local 5187-88.



Apperson Service is a Revelation

Those who become Apperson owners are always impressed with the thoroughness and efficiency of Apperson Service. As one owner remarked recently, "The kind of service you render and the real interest you show makes the satisfaction of Apperson ownership 100% complete."

For example when you need service, your car is personally inspected first by Mr. O. W. Hoffman, Service Manager. The service report is then filled out in triplicate, one copy of which is sent to the General Manager, where its contents are recorded in a permanent file. Another copy is then sent to you.

As a result of this method we have a complete chronology of every Apperson car we sell. Should you want to sell or trade, we can tell you the exact mechanical condition and value. This plan in conjunction with our monthly inspection service makes of every Apperson owner a real enthusiast.

WILLIAM T. TAYLOR
Eastern Distributor

Broad and Race Sts. Philadelphia
Mr. John L. Brown will gladly explain and demonstrate the many superior points of the Apperson. Ask or phone him.

Here are two of a series of service advertisements used by a Philadelphia dealer. They proved so successful that he was obliged to republish some of them. The series idea is a good one where the total amount to be expended and the territory to be reached justify it

is getting 75 per cent of the benefit, too. Every cent that the factory spends on advertising helps his dealers and every cent the dealer spends help his factory. Advertising is about the only commodity in the world where you can get 150 per cent benefit for a 100 per cent investment. It's like getting three gallons of gasoline out of a two gallon can.

Direct Your Publicity on Service Lines

Incidentally, your publicity work should follow the lines of your advertising. The idea of tons and tons of publicity on new cars going through the mails when there are no new cars to sell, as has happened in the last year or so, is almost a criminal waste of energy and paper.

As one who for several years conducted the automobile department of one of the largest newspapers in the country, the writer knows just exactly how he would regard the present publicity. The business of the Automobile Editor for the last two years has not been to help stimulate a demand for automobiles but rather to do educational work in telling present owners how they could get most good out of their cars. That was his duty to his readers—his first and foremost duty—and it was also his duty toward the industry, of which he was not an unimportant part.

Automobile Editors have shown that they appreciate that this is the present status of their profession by eagerly using nearly every scrap of maintenance

information on which they could lay their hands. Maintenance and repair information and news has been preferred copy for the automobile page for the last two years.

In spite of this, however, dealers do not seem to have realized their opportunity. Desiring publicity and advertising, they have permitted publicity to be sent out which is worse than useless to them. The manufacturer is, perhaps, a little bit too close to the industry to realize just what it needs. Factories may realize the value of service advertising, but they rightfully feel that the initiative in such advertising should come from the man whom it most benefits, the dealer service man.

To go thoroughly into the publicity end of the dealer's problem would be another article in itself and can be touched only briefly upon in this one. The easiest way for the dealer to handle the problem is to request his factory, instead of sending its publicity direct to the newspapers of his town, to send it to him and then resubmit it himself. In that way he can stop all the publicity which he does not believe will be beneficial to himself; rewrite many of the stories so that they will fit local conditions and keep in a more personal and direct touch with the newspapers.

Used Car Advertising Somewhat Novel

The Used Car advertising situation is less complicated than the Service advertising in that it is so closely related to the new car advertising. In fact, it might almost be said that it is the same thing under a slightly different guise. The only real development of Used Car advertising which has come in the last year or two has been the use of some display space instead of confining all of it to classified "want ads" as formerly was the case.

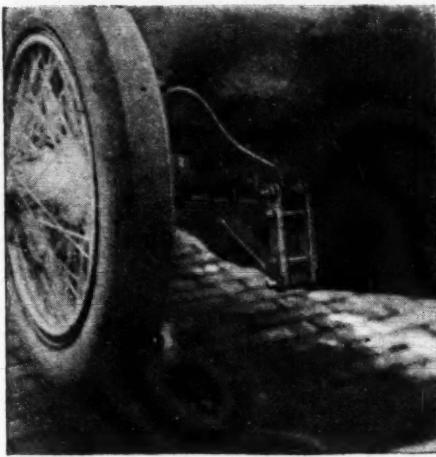
There is one new thing, however, which might be mentioned in this respect. That is the inclination of manufacturers, dealers and service men to substitute the term "rebuilt car" for "used car." A few years ago all cars which were sold for a second time were known as "second hand" cars. The transition to the more euphonious "used car" was made with little difficulty and it is probable the next year or so will see the expression "rebuilt car" in as general use as "passenger car" is used to describe that part of automotive product.

The use of the show as a means to advertise the Used Car Department is a movement which has gathered considerable strength in the last few years. The Chicago Automobile Trade association probably was the pioneer in this venture and it proved so successful that scores of cities are now following it. The Chicago Used Car show originally was undertaken principally for its advertising value, with little thought of direct sales, but sales have come so readily that the show is now not only a great advertisement but pays for itself a score of times over in the sales which are directly attributable to it.

Small Engines Cut Pit Stops in Half

Indianapolis Race Proves Efficiency of 183 Cu. In. Piston Displacement Engine,
Which Is Only Slightly Larger Than the Ford Power Plant
and Develops Over 100 Hp.

THE most important lesson that the Indianapolis race taught, is that the light cars with their small engines, though really slower in maximum speed than the large cars of last year, were faster as far as averages go, because of their consistency. In last year's race



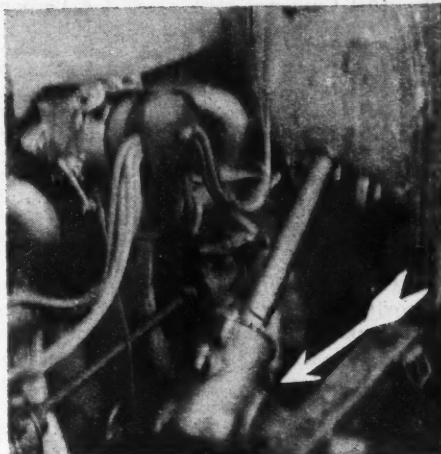
The left rear spring on the Meteor broke and later the right rear spring also broke. The frame of the car rode directly on the axle. This breakage resulted in the car being ruled off the track

BY ROY E. BERG

there were sixteen cars that qualified at better than 95 m.p.h. In this year's race only five qualified at 95 m.p.h. or better. In last year's race seven drivers qualified at better than 100 m.p.h. In this year's race not one driver qualified at better than 100 m.p.h. Notwithstanding this, last year's average of 87.95 m.p.h. was bettered this year to 88.55 m.p.h. The reason for the higher average speed is seen in the consistent performance of the smaller cars. Last year the cars made 106 stops at the pits for gasoline, oil, water, tires and mechanical repairs. This year only fifty-eight stops were made for various reasons. Tire trouble was greatly reduced, for during the whole race only thirty-three tires were changed. Last year this figure was more than doubled for sixty-six stops were made for tires alone, and it is probable that during many of these stops more than one tire was changed. It is also worthy of note that the winning car in this year's race did not change a tire during the whole 500 miles. The winning car, in fact, made but two stops, and these were for gasoline and oil. Better ignition was employed on the winning car and no trouble was encountered from this source.

The first stop at the pits was made

by Ralph DePalma, the famous Jinx artist. A right rear tire blew and this was changed in twelve seconds, which constitutes a record on the Indianapolis track. This bit of trouble was experienced during DePalma's first lap, which made it disconcerting to say the least. Outside of the stops for tire changes, the



The gasoline line of one of the Duesenberg cars broke. The arrow points to the bottom of the nipple as it appeared with the broken pipe hanging to it

Why They Stopped at the Pits and How Often

Car No.	Total Stops	Tire Chgs.	OTHER MISCELLANEOUS TROUBLE	Car No.	Total Stops	Tire Chgs.	OTHER MISCELLANEOUS TROUBLE
2	5	5	Mechanic ran in for 5 gal. gas. Magneto dead on back stretch and car caught fire. Reamed and finished.	16	1	..	Out 140 lap.
3	3	2	Hit wall and broke steering knuckle. Repaired tie rod. Repaired steering linkage. Tighten shocks. Out 94 lap.	17	..	..	Out 16 lap with broken crankshaft.
4	2	0		18	..	..	Out 65 lap with valve trouble.
5	1	1	Went off track and probably broke steering gear. Out 58 lap.	19	2	..	Out 23 lap. Ruled off for slow speed.
6	4	2	Changed plugs and replaced broken steering lever. Out 192 lap.	25	2	3	Adjusted magneto breaker.
7	1	..	Out on account of broken steering lever. 115 lap.	26	3	3	Adjusted steering arm. Repaired tie rod.
8	..	..	Out for broken steering arm. Out 41 lap.	28	4	1	Oil cup leak repaired.
9	6	..	Cleaned plugs. Adjusted carburetor. Adjusted magneto breaker and repaired mag. drive. Overhauled carburetor.	29	3	..	Repaired broken valve spring two different times. Broken valve dropped into cylinder. Oil pump broke. Out lap 149.
10	2	3	Ran on broken valve spring.	31	3	4	
15	3	2	Broken valve spring repaired. Reamed out valve guide and renewed valve rocker pin.	32	6	..	Changed all plugs twice. Loose magneto ground wire connection repaired.
				33	2	..	Universal joint trouble.
				34	4	4	Broken steering arm repaired. Rear springs broken and car ruled off track lap 145.
				Totals	58	33	Seven cars had serious steering gear trouble.

Official Times of Every Car for Each Twenty-

Car No.	NAME OF CAR	DRIVER	25 Miles	50 Miles	75 Miles	100 Miles	125 Miles	150 Miles	175 Miles	200 Miles
2	Ballot	R. DePalma	0 17 26.85	0 33 52.50	0 49 53.15	1 53 39.90	1 21 44.15	1 38 8.15	1 57 36.80	2 14 13.65
3	Monroe	L. Chevrolet	0 17 26.35	0 34 21.05	0 51 12.15	1 75 59.50	1 24 42.75	1 41 8.65	2 48 34.35	3 13 12.75
4	Monroe	G. Chevrolet	0 16 40.10	0 33 18.60	0 50 0.05	1 63 2.40	1 23 6.10	1 39 29.55	1 56 7.65	2 12 53.15
5	Monroe	R. Sarles	0 19 20.05	0 36 38.75	0 54 1.45	1 11 32.25	1 28 51.15	Out on	58th Lp.	
6	Frontenac	J. Boyer, Jr.	0 16 37.30	0 33 5.30	0 49 39.80	1 54 0.60	1 21 43.75	1 38 3.60	1 54 33.40	2 11 13.60
7	Frontenac	B. Hill	0 17 51.95	0 35 18.65	0 52 24.95	1 9 9.25	1 26 20.30	1 43 25.15	2 00 27.35	2 21 24.55
8	Frontenac	A. Klein	0 16 37.90	0 33 11.90	0 50 0.65	Out on	40th Lp.			
9	Peugeot	R. Howard	0 18 17.15	0 36 33.15	3 19 36.60	3 39 37.70	4 5 8.00	4 25 39.15	4 45 57.70	5 5 42.25
10	Duesenberg	T. Milton	0 17 27.85	0 34 27.20	0 51 30.40	1 84 7.15	1 26 3.10	1 43 22.30	2 00 52.95	2 17 59.50
12	Duesenberg	J. Murphy	0 17 48.50	0 35 0.85	0 52 18.45	1 9 41.85	1 27 9.00	1 44 37.00	2 2 19.25	2 19 46.80
15	Revere	P. Henderson	0 19 32.10	0 37 31.10	0 55 15.60	1 13 10.85	1 30 47.90	1 48 36.15	2 6 25.80	2 24 20.15
16	Peugeot	J. Goux	0 18 7.60	0 35 39.15	0 53 5.80	1 10 37.55	1 28 7.05	1 45 35.35	2 3 14.65	2 21 1.65
17	Peugeot	A. Boillot	0 17 49.60	Out on	16th Lp.					
18	Peugeot	H. Wilcox	0 17 25.15	0 34 24.10	0 51 32.30	1 8 43.30	1 26 2.15	1 43 21.65	Out on	65th Lp.
19	Gregoire	J. Porporato	0 20 56.20	1 11 45.30	Out on	23d Lp.				
21	Gregoire	J. Scales								
25	Ballot	R. Thomas	0 17 1.20	0 33 44.15	0 50 11.05	1 6 40.05	1 23 10.00	1 39 34.45	1 56 15.80	2 12 55.40
26	Ballot	T. Chassagne	0 16 39.35	0 33 17.95	0 49 51.30	1 6 16.30	1 22 49.70	1 39 25.10	1 56 29.85	2 13 20.60
28	Monroe	J. Thomas	0 18 23.30	0 35 59.85	0 53 10.50	1 10 54.60	1 28 27.15	1 46 35.15	2 5 00.95	2 22 49.50
29	Duesenberg	E. O'Donnell	0 17 33.85	0 34 53.40	0 52 8.75	1 9 33.60	1 27 4.85	1 44 30.25	2 27 56.25	2 55 10.65
31	Duesenberg	E. Hearne	0 18 10.10	0 36 12.15	0 54 12.05	1 13 24.00	1 30 56.50	1 48 36.55	2 6 47.40	2 25 10.30
32	Richards	J. Bolling	0 38 25.30	0 57 4.90	1 15 59.15	1 34 41.15	1 53 40.10	2 12 35.65	2 31 35.55	2 50 34.30
33	Mulford	R. Mulford	0 20 8.75	0 40 46.20	1 15 1.10	1 24 42.00	1 48 48.15	2 35 5.15	2 55 3.40	3 15 4.30
34	Meteor	W. Haupt	0 18 43.60	0.36	3 4.00	0 53 54.70	1 11 28.15	1 28 58.60	2 12 40.15	2 29 43.25

next greatest offending member was the steering gear mechanism. Many of the cars suffered from this trouble. Five of the cars entered by the Wm. Small Co., the four Monroes and the three Frontenacs, suffered steering gear trouble. The Meteor, and the Ballot driven by Chassagne, also suffered steering gear trouble. Spark plugs were offenders to a slight degree, but not to the extent that the ignition apparatus was. Especially noticeable were a few cases of ignition trouble; the magneto not performing as they should have. It is probably true that the extreme high speeds of this year's small engines was the chief contributing factor for the magneto trouble. Valve trouble and other miscellaneous items contributed to the total, and made necessary the fifty-eight pit stops.

DePalma was credited with a case of bad judgment for letting his fuel run out on the track when his mechanic came running in for 5 gal. of gasoline. Ralph had calculated that he could successfully complete the 500 miles on one tank of gasoline, which he did. The cause of the trouble which he had was due to one of the two magnetos. The Ballot car which Ralph drove was equipped with two magnetos, one for



Repairing the broken steering lever
on the Meteor

each set of four cylinders. Ralph found that his engine was spitting back through the carburetor of the rear set of cylinders, which led him to believe that his gasoline was just about out. Finally the engine kicked back energetically and the carburetor caught fire. After resuming the race the engine again caught fire. So that he might finish and not have the engine burn up De

Palma removed the plugs from the rear four cylinders and finished the remaining few laps of the race on the other four.

The second lap of the race, the Richards car driven by Bolling arrived at the pits with a silent engine. Upon examination it was found that a ground wire from the magneto was loose. All the plugs were changed, though, before the trouble was found and this caused quite a delay for this car's average for the first twenty-five miles was only 39.1 m.p.h. The next stop was made by the Revere, which came in for a rear right tire. The change was made in 16 seconds. In the seventh lap of the race, Roscoe Sarles in the Monroe came in for a left front tire.

The Gregoire, driven by Porporato up to this time had been driving very slowly. The engine, to all appearances, was functioning properly, but the car had no speed. It was evident that the gear ratio was too low, and this factor contributed largely to the discouragement of Jack Scales, who was to pilot the other Gregoire. These cars came with only the one gear ratio for the rear axle and it was not possible to get other gears made in time. The Gregoire, which did appear on the track, seemed to be improperly

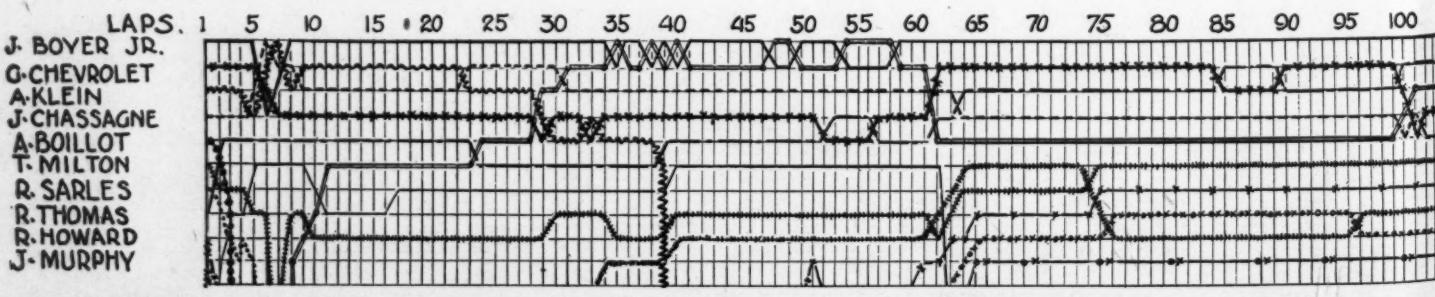


Chart showing how the positions of the first ten places varied during the five hundred

Five Miles at Indianapolis 500 Mile 1920 Race

Miles	225 Miles	250 Miles	275 Miles	300 Miles	325 Miles	350 Miles	375 Miles	400 Miles	425 Miles	450 Miles	475 Miles	500 Miles	P.	Car No.
13.65	230 33.40	246 47.15	3 234.65	3 1836.45	3 3457.55	3 5118.40	4 759.00	4 2436.15	4 420.65	4 5833.50	5 4040.20	6 519.15	5	2
12.75	331 51.85	Out on	94th Lp.											
53.15	229 27.15	246 15.40	3 445.80	3 2123.45	3 38 8.90	3 54 47.15	4 1127.25	4 2818.15	4 4510.55	5 2 1.10	5 19 5.75	5 38 32.00	1	4
13.60	227 47.00	244 36.45	3 318.95	3 1949.55	3 3624.00	4 0041.80	4 1725.50	4 4033.20	4 5737.65	5 1432.05	5 3129.35	Out on	192	d L.
24.55	238 54.30	256 22.85	3 1334.25	Out on	115th Lp.									
42.25	525 41.85	548 37.55	6 853.80	6 3027.15	6 49 8.80	7 720.95	7 2542.70	Still Ru	n ning.					
59.50	235 11.05	252 26.05	3 1223.35	3 2923.85	3 4630.45	4 335.90	4 2024.10	4 3722.25	4 5414.65	5 11 7.30	5 28 4.10	5 45 2.48	3	10
46.80	236 57.80	254 10.00	3 1136.95	3 3112.65	3 4857.15	4 624.00	4 2338.15	4 4048.30	4 588.15	5 15 27.95	5 34 9.50	5 52 31.35	4	12
20.15	242 12.95	3 133.80	3 1935.30	4 255.70	5 049.55	5 2028.10	5 4028.40	6 0049.15	6 2120.00	6 42 4.70	7 3 2.00	7 2353.95	10	15
1.65	238 41.20	257 52.45	3 1516.65	3 33 3.25	3 5054.60	Out on	140th Lp.							
h Lp.														
55.40	229 27.60	246 8.75	3 231.10	3 223.15	3 3857.15	3 5600.30	4 1252.95	4 2939.90	4 4622.15	5 10 14.60	5 27 26.40	5 44 51.60	2	25
20.60	230 10.25	247 2.00	3 649.15	3 2314.30	3 4017.20	3 57 2.85	4 1334.65	4 3018.15	4 47 6.45	5 3 29.10	5 47 36.70	6 15 16.65	7	26
49.50	240 39.45	258 36.15	3 1858.60	3 4031.00	4 242.30	4 21 6.90	4 3927.35	4 5740.43	5 16 52.35	5 36 7.80	5 58 44.15	6 21 41.55	8	28
10.65	312 19.00	329 24.45	3 4642.20	4 349.95	2 131.54	4 3842.45	Out on	149th Lp.						
10.30	246 4.20	3 6226.55	3 2420.90	3 4235.15	4 042.70	4 1825.75	4 3650.45	4 5511.35	5 1346.45	5 32 28.15	5 51 18.10	6 10 22.55	6	31
34.30	311 17.75	322 27.05	3 5248.70	4 1119.30	4 2951.30	4 4829.70	5 7 9.50	5 3130.20	5 5019.15	6 18 0.80	6 55 20.35	Out on	119	Lp.
4.30	385 3.90	3 5513.15	4 153.90	4 3517.30	4 5529.75	5 1822.15	5 3818.10	5 5758.75	6 18 6.85	6 3837.15	6 5815.60	7 1714.25	9	33
35.65	3 32.60	3 2015.15	3 37 3.20	4 125.15	4 2031.05	4 3935.60	Out on	145th Lp.						

shocked, for on the turns the car behaved very strangely. This was the reason why Porporato was flagged in for consultation concerning the antics of the car. The snake-wriggling fashion that the car had made it very dangerous for other cars to pass it.

At the seventeenth lap, Andre Boillot was seen walking in. His Peugeot car experienced engine trouble and it is thought that the crankshaft broke, at least this is what the mechanic said when questioned. The Peugeot cars entered by Jules Goux and driven by Goux, Howdy Wilcox and Boillot are not to be confused with the Peugeot driven by Ray Howard. Goux's cars were entirely new creations, with several new wrinkles incorporated in their construction which apparently needed further development before attempted in any car to be tried on Indianapolis track. These cars had three camshafts, and five valves per cylinder. Two of the valves were exhaust and the other three intake. At low speeds, the third camshaft did not operate the auxiliary intake valve, but at high speed, when greater power is needed, the driver shifted a small hand lever, which threw the third valve into operation. With all due respect to the intentions of the designer we do not feel



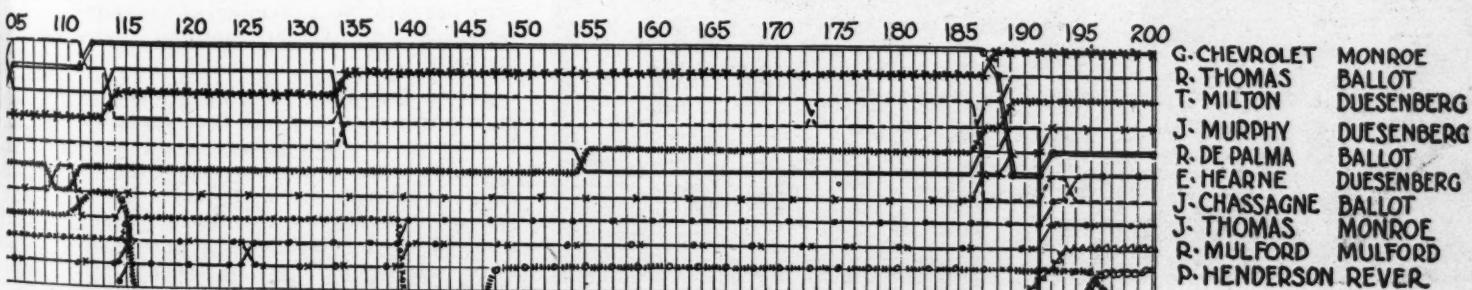
Another case of a broken steering lever. This is one of the Joe Boyer's Monroe with the wheel removed and a new steering lever being put in place

that the construction was the best. The principle was ideal, but the application did not prove practical. These three cars lasted only a short while.

Car number nine, the Peugeot driven by Ray Howard, came in on its twenty-

third lap with an occasional explosion sounding from its exhaust. Much difficulty was experienced in fixing this car so it would run at all. At first it was thought the spark plugs were causing the trouble, and the first three were replaced, with no noticeable improvement in operation. Next the carburetor was readjusted, the jets examined and finally the magneto was subjected to scrutiny. The ignition was retimed, and in all a good many things were done and the car was finally started after a long delay. It was finally discovered that one of the small jets from the carburetor had been sucked up into the manifold. So long was this delay that the average speed up to the seventy-five mile mark was only 22.5 m.p.h. This car experienced considerable trouble during the tuning up periods. Two complete engines were on hand at the garage. The car was tried out very nearly every day for two weeks before the race. Different magnetos were tried. New carburetors and various sized jets were experimented with to no good effect. When finally the day of the race dawned this car, which was one of the first to put in an appearance at the track, was not ready. At a later stop, a whole new

(Concluded on page 31)



SIXTH. E. HEARNE --- SEVENTH. J. CHASSAGNE --- EIGHTH. J. THOMAS --- NINTH. R. MULFORD ---

TENTH. P. HENDERSON -----

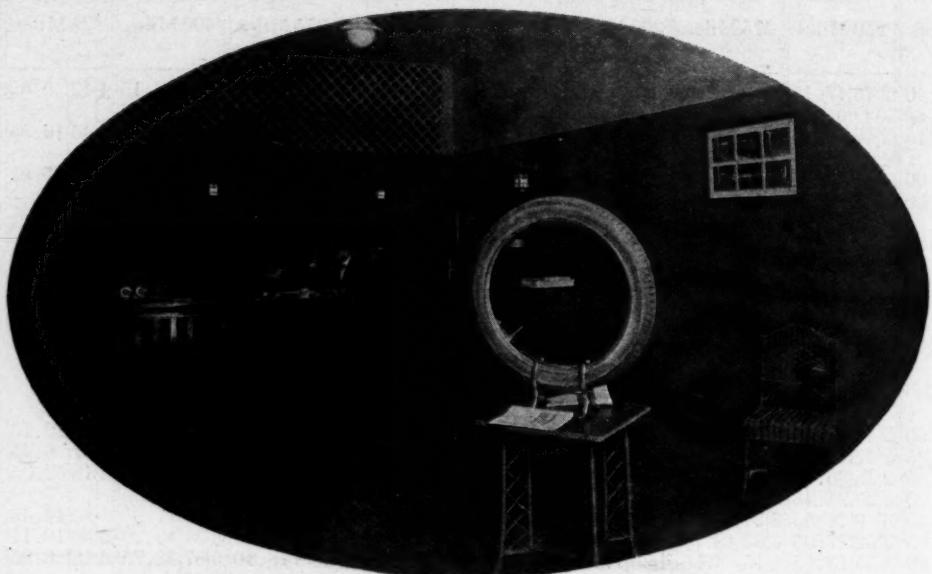
miles. The consistency of Gaston Chevrolet's driving shows why he won the race.

Don't Repair Tires in Your Salesroom

Making Cleanliness One of the Features of the Tire Service Building and How It Has Pulled Trade

"THIS is the first tire store I've ever been in where I didn't feel like picking up my skirts and running out of the place," said a woman in the salesroom of the Fort Wayne Tire Service Co. recently, as she looked around appreciately at the wicker furniture, the clean, attractive room, and the flower draped trellis behind the sales counter. "Why," she added, with a smile, "this looks more like the woman's department of a high class bank than it does like a place where tires are sold!"

The sentiment of this particular woman regarding this new establishment is echoed by all the other women who enter the store, either for the purpose of purchasing tires or just for the sake of seeing what the store looks like. And it is no wonder that the women should be so enthusiastic about the store and so loud in their praise of it. The Fort Wayne Tire Service Co. is making a definite drive for the trade of women automobileists because, as J. Chester Law, the manager of the store, says: "Women are, in our opinion, going to do a lot of purchasing for the family automobiles in the future, just as they now do the



People like to see tires unwrapped before buying them and feel and pinch them to see if they can discover any flaws. On the counter are cross sections of tires and tubes and it is surprising to see the interest women take in examining these parts

purchasing for the family table. Already this is largely the case and it is going to come eventually just as suffrage is sure to come."

It is in the belief that women hate to shop in ill-kept or dirty places that the Fort Wayne Tire Service Co. has eliminated all repair work from its salesroom and has relegated all the disagreeable

features of the tire business to the rear, where such features are kept strictly out of sight. And it is because the management wants to make all women customers feel entirely at home that the store has installed handsome brown wicker furniture in its sales room, has put rich brown floor covering on its floors, used brown as the attractive color scheme for the wall decorations and has installed brown hoods on the lighting fixtures.

"We want to make this store a sort of meeting place for motorists, both men and women," said Mr. Law. "We want all motorists to feel free to make appointments here and to use our salesroom for lounging purposes. We have installed a telephone for the use of everyone who comes into our store and we have also subscribed to some motor magazines which we will place on the table, where anyone who wishes to do so can read them or consult them. We are going to try and make everyone who comes into our place feel perfectly at home, whether they come for the purpose of buying anything from us or not."

In addition to this unique method of catering to the women's trade the concern has adopted a number of other interesting and rather unusual sales methods.

Across the street on a telegraph pole an electric spotlight has been installed. During the evening this spotlight plays upon the front of the store, and throws it into prominent relief. By doing this it inevitably attracts the attention of passing motorists to the establishment and makes them talk about it. As Harrison street, on which the store is located, is one of the thoroughfares on which motor traffic is particularly heavy at night, it is evi-



The clean front appearance of the Fort Wayne Tire Service Co. gives a good impression to passing prospects and the clean exterior is backed up with an interior in keeping with it

(Concluded on page 50)

Off the Main Street but Making Good



In the winter, when it is found necessary to keep the doors closed, an electric bell is attached to a telegraph pole a hundred feet away and the driver may ring it without alighting. The door opens automatically.

DEVELOPMENT from an average neighborhood garage with a patronage during the first year never exceeding twenty-eight motor car owners to a landing and the only two-story public garage of its kind in the city in less than five years is the record of the Worthington Garage, St. Louis.

The facilities and general individual characteristics of this garaging establishment have attracted city-wide attention because of their combined uniqueness and serviceability, a second story being provided for the storage of passenger cars and trucks. The popularity of this multi-storied structure has grown so extensively that the owners are contemplating the erection of a third floor accessible by a proposed elevator and thus affording additional parking space without the usual necessary expansion of ground flooring.

Runway to Upper Floor

The present system of arriving at the upper story is by means of an inclined runway arranged at an angle of twenty-five degrees, which enables the slowest car to make the grading.

There are four prime factors advanced by Samuel Cohn, proprietor of the establishment, which are asserted to be the basic principles which have led to the unusual successes experienced. They are: Accessibility, Constant Service, Minimizing Inconveniences, and the Employment of Efficient Labor and Advisors.

The garage, which was established in



The main street is often not accessible in bad weather and putting a garage in an alley is preferable to a high priced open street

the fall of 1915, was then in what was considered a growing residential and apartment house district. To-day the immediate community has expanded more than four-fold and owns more motor cars per capita than any other district of the entire city.

The building is situated in a large court formed by three intersecting streets. The court is triangular and is faced on all sides by the rear elevation

of residences and apartment buildings. It is reached by wide passageways from three directions and because of its central location receives most of the patronage from the motor car owners living in the district. During the summer months, according to Mr. Cohn, he has housed as many as 350 motor cars and trucks, although the latter are in the minority, greater effort being diverted in directions which will increase passenger car owners as patronage of the garage. The average all-year-round number of cars in storage is approximately 275.

Electric Bell Adds to Convenience

For the two-story garage the alley has proved a double asset because of the need of a long driveway before reaching the slanting runway to gather up speed. Speeding up on a public street conduces resentment on the part of neighboring establishments and invites accident.

During the winter months, when it is found necessary to keep the doors closed, an electric bell is attached to a telegraph post a hundred feet from the entrance to the runway, and the driver

Accessibility: In the opinion of the proprietor the location of a garage is the most important factor to be considered when new men enter the field. Mr. Cohn stated that many garages put too much confidence in main thoroughfare situations for their building, and are thus not only burdened with exorbitant rentals and overheads, but do not in all instances prove successful because the main thoroughfare is usually not as accessible during inclement weather as a residential site. Putting the garage in an alley is advised in preference to a high-price open street.

(Concluded on page 33)

Functions of the Idea Service Department From a Sales Point of View

A Poor Service Department Can Ruin More Sales Than a Good Sales Department Can Make

NOTHING in the world has the right of existence that does not serve humanity. You can build the best motor car in the world and get the best sales department in the world for it, but if you do not arrange for the service on this car to be conveniently obtained by the owner, both the work of the best engineering department and of the best sales department will fail.

Given the right product properly presented; given a properly functioning service organization and the work of the sales department is indeed a thing of pleasure and joy.

After a concern has been in operation a sufficient length of time for its product to have attained a fair saturation point in relation to its market, I believe that if the service department functions as it should, from fifty to seventy per cent of the ensuing product of the company can be merchandised to its old owners. In other words, assume that there are 40,000 cars of a certain make in existence; assume an output of that factory of 12,000 cars a year—I maintain that the manufacturer has a reasonable right to expect that from 6000 to 9000 cars can be sold to the 40,000 owners then in existence annually. But you can readily see that this will only be true if the service department is functioning well and supporting the sales department by making these 40,000 owners satisfied. The service department's main work is on after the guarantee period has expired.

Service and Sales Closely Related

Now if this is true, you will readily see that there is a very close relation between the two departments, and they should operate along very parallel lines. Also this will show you the tremendous influence the service department can eventually wield on sales.

A poor service department can ruin more sales than a good sales department can make—also a good sales department cannot permanently sustain the ill effects of a poor service organization. If I were a dealer and were forced to make my choice of two evils—that is, a poor service department or a poor sales department—I would prefer to have the poor sales department, which is another way of saying that the dealer must have a good service department if he has any right of future existence. Therefore, you can readily understand why I am essentially more in sympathy with the service man than with the salesman.

The salesman retailing motor cars has a right to expect from the service de-

BY F. E. MOSKOVICS

Vice-President, Nordyke & Marmon Co.,
Indianapolis.

Here are two of the papers delivered at the Service Managers' Convention, held at Indianapolis recently. In subsequent issues of MOTOR AGE will be published extracts from more of the various talks given. The dealer and service man are vitally concerned with what the factory is doing regarding service and these articles should prove of much value to them.

partment a few fundamentals, without which the department is unworthy of its name.

First, the department must have the physical equipment, which means proper room, machinery and a sufficient supply of parts to reasonably take care of the business. We consider this so important that within the past few months the Nordyke & Marmon Co. have established what is known as a field maintenance department. This department has the duty of seeing that every dealer of the Nordyke & Marmon Co. has the proper physical equipment to give reasonably good service, and the knowledge of how to do this. It is not a part of this department's function to see that the dealer actually gives service—simply that they have the proper physical equipment, properly located and arranged stock rooms and proper systems for handling the work and the stock. It is also the function of this department to see that the executives of the shop know how to do this work. This department, in other words, is the mechanical adviser of all our dealers in the arrangement of their shop and their layout and routing of work and material.

Second, the salesman has a right to expect that the service department have a most intimate knowledge of the product and given the proper equipment knows how to utilize it.

Third, he has a right to expect that the service department has the mental grasp and organization to take care of the work when it comes in and to take care of that most terrible enemy of the salesman—broken promises. I believe that all the imaginary troubles between these two departments rest mostly on this one ground—broken promises. Nothing can so provoke a customer as to be promised a car on Thursday, when he is planning to leave for the week end

on Friday, and then when he gets it to find it incomplete, or in place of his car he gets a nice promise, which when deflated will not take him very far on his trip. The salesman has the right to expect the service department to courteously inform the customer sufficiently in advance if unforeseen contingencies, over which the service department had no control, would not permit the car to be delivered on time, so that the customer could have made other arrangements to avoid these twelfth hour disappointments.

Fourth, courtesy—and there the salesman usually makes his biggest kick. This is the cheapest thing the service department has to dispense. The salesman has the right to demand that special study and attention be given to this one little thing, and how few service departments actually deliver on this—the cheapest thing they have.

I do not believe a sales department can expect more than these things from a service department, but given these things and given a ground of common understanding, the service department is of immeasurable benefit in advancing and furthering sales. One of our sales executives has called the service department the "Rear Door Sales Department."

Should Understand Each Other

The two departments should have a sufficient meeting ground to understand each other. They should get together frequently and frankly tell each other their mutual troubles. This will permit the salesman to really sell the service, and if the meeting is sufficiently frequent, and if they come to understand each other better, you will eliminate the danger of the salesman exaggerating the possibilities of the service department. In other words, I believe it is the duty of you gentlemen to see that the sales departments connected with your dealers fully understand all the real problems of service; understand the terrible, harrowing difficulties that we are going through at the present moment in the transportation of parts, the obtaining and training of help; the obtaining of adequate room and what it means to even keep up a semblance of truly good service in these times. Unless the salesman well understands this, you cannot blame him for expecting too much and taking the side of the customer at all times. It is up to you first to sell yourself to your own organization—yes, and to sell your troubles to your own sales department. If you cannot succeed in doing this, how can you hope to impress it on your customers.

In our own work we are prone to take the side of the service man. We understand his problems, we have studied them carefully. We look upon the service man in the same light that the superintendent of maintenance of a railway should be regarded. We figure his duties are just as important, because in the last analysis he is keeping up one truly important line of transportation.

The service man has to be a mixture of salesman, diplomat, teacher and a monument of patience, in addition to the small qualities of being a perfect mechanic, a crack organizer, a lawyer, and perhaps a little medical knowledge, and to understand psychology would not come amiss. Given these attributes, we

figure he has a fair chance for success. Now when you find a man with the elements so mixed in him, you have got to admire and sympathize with him.

In our own work we try to get into the minds of the service man the following prime facts:

First, the proper physical equipment, including room and all special tools. The knowledge of how to use the equipment and the materials to use it with, and given this we figure the salesman has the right to expect courtesy, reasonable promptness and good work.

We have never felt that free service was the great essential so much as prompt and efficient service. We figure that a man is willing to pay for good

service, providing he gets it with reasonable dispatch. I do not feel the salesman has a right to expect that everything that is done to the car for a year after the owner purchases it, should be done free, but he has the right to expect it to be done when promised and when it is done to be finished so it will "stay put."

We have clothed the service department with a positive dignity. We do not look upon it as a necessary evil, but as a branch of the business fully on a par with the sales department and just as important to our future welfare and to the satisfactory performance of our product in the hands of that final judge of all of us, the owner.

What the Service Department Expects of the Salesman

BY R. B. PERRY

Service Manager, Allen Motor Car Co., Columbus, Ohio.

point takes the stand that he is right, serious harm may be done. Let him learn in detail the nature of the complaint and refer it to the service department for investigation, assuring the dealer or customer that all errors for which his company may be responsible will be rectified.

The service department expects the salesman to report conditions in the territory which call for attention on the part of the service department. It is recognized that well intentioned effort on the part of this department may at times result in complications in certain territories which in turn develop sales resistance. The quickest way to clear up such situations is to report fully with respect to each case from the salesman's angle. Not only should the service department profit from each case of this kind with which it has to deal and be in a position to avoid repetitions, but the salesman will shun the risk of losing prestige which is likely to result from efforts to make adjustments on his own initiative.

The service department expects that the factory salesmen will, in recommending dealer contracts, take into full consideration the importance of the dealers service facilities. It sometimes seems that the salesman's estimate of a prospective dealer's desirability from a factory standpoint is based upon the dealer's location on automobile row, his financial responsibility and the size and quality of his sales force. Those of us who have, however, struggled with problems of service would be more likely to push through the imposing showroom, brush aside the courteous and attentive salesman—even shut our ears to glowing recommendations of the bankers—and see for ourselves whether or not the dealer we were considering had a well lighted, well manned and clean service station—provided with necessary equipment and backed up by a well stocked parts room. We would be interested to learn whether or not the department to make good his claims.

same courtesy were extended the owner by the service department that had been accorded him by the salesman and whether the owner recommended the dealer in the same hearty terms as did the banker. If we found conditions favorable here we could overlook certain shortcomings in the matter of location, sales force or even finances—because we would feel that those shortcomings would be speedily overcome as a result of the sales impetus which would be sure to be derived from thoroughly satisfactory service. So the service department expects the salesman to inquire into the vastly important detail—and other things being at all equal recommend as a desirable dealer the man who is well grounded on the foundation of good service.

Keeping the Salesmen Informed

The service department expects the salesman, unless he be thoroughly qualified, to refrain in general from technical discussions. He should without question be informed as to troubles—particularly those of a chronic nature occurring in the product he is selling. He should be informed also as to remedies which are being applied. He should be advised of any critical conditions which may be preventing prompt shipment of parts. But this information should be employed by the salesman only to the extent of meeting the trade intelligently. He will earn the gratitude of the service department if he does not embarrass it by attempts to diagnose specific cases of trouble, but instead relies upon the service department to investigate and correct.

The service department expects the salesman to know what are the limitations of the car he is selling. If, for example, the car has a maximum speed of sixty miles an hour under favorable conditions, it is useless to attempt to meet the argument of the prospective buyer or dealer that "the car is not fast enough" by arranging to have a service man call upon him to "tune the car up" so that greater speed will be possible. Very frequently the salesman over-rates the car and relies upon the service department to make good his claims.

THE service department expects the salesman, whether he be connected with the factor organization or a retail man dealing with the ultimate consumer, to inform himself fully of the functions and policy of the service department. The prospective dealer or owner accepts statements made by salesmen as official and his faith in the organization with which he is dealing if not in the product itself is badly shaken if he later discovers that he has been misled. The service department expects the salesman, therefore, to sell only such service as is offered by the company.

The service department expects that the salesman will as a rule follow the policy of "hands off" in matters pertaining to service. The traveling service representative or service manager who would undertake adjustments in territory or revise schedules for delivery would certainly be unpopular with the management. Yet has a salesman on the other hand any more right to arrange adjustments on defective parts or to agree to send a service territory man on a specified date for an unlimited stay in some dealer's territory?

Co-operation Needed

The service department expects the salesman's hearty support. It should be taken for granted by the salesman that the service department is operating in a manner satisfactory to, and in accordance with, a policy approved by the management. In his travels through the territory the salesman will inevitably meet dealers and owners who will complain of service. Without question the service department from the nature of its functions is constantly subject to criticism. If a repair part does not arrive promptly or the wrong part is received, the service department is usually blamed. Yet the service department has no control over the vagaries of the mails and telegraph; it cannot regulate express and freight movements, nor can it be held responsible if an order calls for a propeller shaft when an axle shaft is really wanted. Nevertheless, the dealer or owner will complain and if the salesman at this more or less critical



EDITORIAL



Better Instruction Books

It brings to light the fact that many of our present day instruction books either are lacking in necessary information, or take up repairs and service work which calls for tools and equipment no owner can hope to possess.

It is not intended that the dealer's service station should be called upon for doing many of the minor operations necessary to the proper running of any motor vehicle, consequently those operations which owners may care to perform themselves should be elaborated upon, leaving the difficult jobs for the service station.

Many of our instruction books go into detail, telling how to tear down the engine, refit bearings, and similar work which the average owner is not competent to do. In such a case it is far better to refer the owner to the dealers' service station, which generally is tooled up to do the work correctly. It is far better to remove a driveshaft gear by means of an arbor press than to tell the owner to hammer it off.

Instruction books to do the owner some real good should take up in detail some of the things that might befall the owner on the road, such as a clogged fuel line, valve adjustment, carburetor adjustment, ignition, etc. We recall a case where one instruction told the owner to drain the oil from the crankcase, but did not say that this involved taking off the under pan, nor did it tell him where to find the drain.

It also is foolhardy to tell the owner about high mica on the generator or starting motor commutators and inform them that they must true up the surfaces and under-cut the mica. How many owners are qualified to do this sort of work? Why not leave out the remedies for this sort of trouble.

Most of the instruction books to-day give an elaborate treatise on the operation and theory of the four-cycle engine, which is all Greek to most owners, even after they have read it. Instead of this let's tell owners how to detect the more common troubles, how to wash their cars, how to care for spare tires and some of the other things which they can do without elaborate equipment.



Building Good Roads Better

endurance. No one anticipated the exceptionally heavy traffic that the roads have had to withstand in the last few months. So heavy has this traffic been on certain concrete highways that the roads have crumbled under the strain.

It is the old story of the railroads brought up-to-date. In the early days our steam trains ran on wood rails covered with strap iron, but this system proved inadequate as the trains increased in weight and capacity. Time has proven to

the railroads the worth of heavy rails. The ninety foot Pullman coach is carried on a one hundred and thirty-five pound rail. The rail is carried on a rock ballasted road bottom. Here is a lesson that our good roads builders should not lose sight of.

To say that our roads should be constructed for twenty-ton loads is not an overestimate. Truck transportation is here to stay. For short hauls the truck leads the railroads by a long margin. But if the application of trucks to the solution of our transportation problems is to be made more intense than it is now we must build good roads better.



Reviewing the Indianapolis Race

CONSISTENCY was what undoubtedly won the race for Gaston Chevrolet and also the reason for the remarkable record which he made with his tires. He only made two stops, both of which were made to replenish his fuel tank. The first one was made at the 250 mile mark and took 1:35, the second one was made about five laps from the finish and took only forty-five seconds. His total time at the post was therefore only 2:20.

A year ago it was freely predicted that there would be fours and sixes in the race but few engineers would have said a little all-in-line vertical eight with 2 9/16 in. bore and 4 7/16 in. stroke would be considered a possibility in this year's race. However, it was this type of engine which propelled the fastest car, the Ballot driven by Ralph DePalma, at 100 miles per hour for a lap during the elimination trials. Although defeated by a four-cylinder Monroe the eight cylinder cars took the palm when it came to consistency. Eight of the ten cars which finished the 500 miles and won positions in the race had eight cylinder vertical all-in-a-line engines. The fact that two engineers, Ernest Henri, the designer of the former Peugeots and the present Ballot as well as Fred S. Duesenberg should have adopted the eight cylinder engine of this type as the one most desired for a 500 mile race is significant. It is also significant that with the change of engineer Henri from the Peugeot camp to the Ballot camp, victory left one altogether, and was almost in the hands of the other, when a magneto put Ralph DePalma out of the running. Just as in the past, the winning of a race is done as much on the engineer's drafting board, months before the race, as it is by the skill of the driver and the workmanship of the mechanics, before and during the race.

The 500 mile races on the Indianapolis Motor Speedway have put Indianapolis on the world map just as the Derby has fixed horse racing as the great sport of England. The fact that nearly \$100,000 was given away at this year's race only emphasizes the importance of this as a sporting event. It is intimated that more than \$200,000 will be given away next year. Indianapolis will probably make their lap prize \$200 per lap instead of \$100. Other automotive producing cities have intimated that they would like to put up a lap prize, and it is quite possible that the total lap prizes will be around \$500, and there is a possibility that the Speedway purse may be increased to \$100,000.

"Service" a Word Coast Dealers Do Not Understand

Truck Men in California Have Mis-taken Idea That It Must Be Given Away Gatis

LOS ANGELES, Calif., June 6—Automotive dealers who are specializing in the motor truck or who have taken on the motor truck as a sideline to their regular passenger car stock, have much to learn in the service end of their business. They still have to learn that service for trucks should be made a department of their establishments rather than a premium offered by the sales department.

They are, in many cases, going the whole distance in giving free service. There seems in many cases literally no end to what a dealer will go to keep his trucks running. On the part of some dealers there seems to be an insane desire to get a lot of their particular trucks on the market, no matter how the sales are made, and then to keep the trucks operating on a free service basis. To do this some are selling the trucks on a long profit and really adding a heavy service charge to the sales price, not as a separate charge, but as a part of the truck list. No matter how the charge is handled the situation created is that the truck buyer is being too liberally schooled to free service. He already looks for it, with the possible exception of large fleet owners who handle their own service and do not look to the dealer for such.

The truck dealers have built up this so-called free service situation, not all of them it is true, but too many of them. Some day they will have to break away and the longer that day is postponed the harder it will be. The truck buyer should be sold on the merits of the truck and not on force service. There is sufficient merit in the truck to make it an ideal investment if properly operated and pay for all service. The truck industry on the coast is not in nearly so healthy condition as it should be and this is partly due to the free service situation.

Overloading is another bane of truck operation out here. It seems to be general from San Diego to Seattle. It is not local to any industries. Sometimes salesmen are partners in the crime. Go from one end of the coast to another and you meet with it everywhere. Here is a typical example of how serious it is. In San Francisco a prospective truck purchaser went to the maker of the axle used in a truck he was considering to see if the axle maker's coast representative would let the axle guarantee stand if he carried 7 tons on a 3½-ton truck.

TRUCK FIRM HEAD ON TRIAL

Jackson, Mich., June 4—Cyrus C. Van Wagner, president and general manager of the Victor Truck Co., Inc., was brought to Jackson this week to answer a charge of fraud in connection with alleged stock sales in this city. The

warrant charges misrepresentation in the sale of stock in the Central City Paint Co. to employees of the Jackson Cushion Spring Co. Van Wagner declined to make any statement, but friends said the warrant was the result of spite work on the part of persons inimical to the interests of the Victor Truck Co.

The Victor Truck Co. is a Michigan concern, capitalized at \$150,000 and it is said in St. Joseph plans were being formulated for the sale of the stock of the truck concern when the request for Van Wagner's arrest arrived. Officials of the Victor Truck Corp. refused to make any statement as to the proposed financing plans of the company and contented themselves with the claim that the action of Jackson authorities was prompted by persons who hoped to hamper the new concern.

Hearing on the case against Van Wagner will be held June 9.

HORSESHOERS GET RAISE!

St. Louis, June 7—Another argument in favor of motor trucks! An increase in wages from \$5 to \$7 a day for 200 members of the Journeyman Horseshoers' Union, with a promise of \$1.75 an hour for overtime, has been granted by the Master Horseshoers' association. As a result of this, the cost of horseshoes has been advanced from \$3 to \$4 a set for ordinary shoes, and from \$1.25 to \$1.50 each for patented and bar shoes, and the cost of removing shoes will advance from 50 to 60 cents each.

According to the figures of City Comptroller Nolte, this will mean that the municipal government must pay approximately \$8000 more a year for horseshoes. The street, sewer, health and water departments have 464 horses, and the fire department, 175 horses. The city's bill for horseshoes in 1919 was \$25,070.26, which was \$1268.53 more than in 1918.

BRITISH KEEP IMPORT TAX

Washington, June 4—Efforts of American commercial organizations to lift the ad valorem duty on motor cars imported to England have failed to move the British authorities. Advices received here to-day from Ambassador Davis show that the action of the Committee of the Finance Act in providing for the continuation of the duty until May, 1921, would stand. The American Chamber of Commerce in London has conducted a movement against this duty which amounts to 33½ per cent on American cars.

PREPARE TRACTOR EXHIBIT

Columbus, Ohio, June 6—For the purpose of holding the national tractor show in Columbus some time in February, the Columbus Tractor & Implement Club Co. has been incorporated under Columbus laws with a capital of \$500. All of the tractor and implement dealers of Columbus are joining in the movement, and much enthusiasm is shown in the coming event.

Marmon Company Adds A New Service Department

"Field Maintenance Bureau" to Aid Dealers In Keeping Their Work-shops Up to Standard

INDIANAPOLIS, June 8—More than two hundred Marmon dealers have been the guests of Nordyke & Marmon Company at the Indianapolis factory during the last three days. The Marmon Dealers' Convention which closed yesterday afternoon was the most auspicious gathering of the selling organization that has ever been held. The time selected for the convention gave the visiting dealers an opportunity to attend the Speedway Sweepstakes Races and then immediately settle down to convention business.

Three new departments of the organization were introduced to Marmon dealers, the field maintenance department, the renewed car department, and the sales extension department. Under the direction of Bert Dingley, well known automobile man and former race driver.

The field maintenance department will co-operate with Marmon dealers to see that the equipment and personnel of the dealers' service departments are kept up to a standard that will insure the highest grade of service being rendered Marmon owners at all times. The renewed car department under the direction of K. R. Spencer, formerly with the Chandler Motor Car Company, will act as the distributing center of Marmon renewed cars which are now being advertised in the Saturday Evening Post. The sales extension department is managed by E. S. Gorrell.

ST. LOUIS COLE AGENCY SOLD

St. Louis, June 7—The Cole Motor Car Co. of St. Louis has been sold by P. G. Walton of Kansas City to a \$50,000 corporation, headed by E. L. Adams, formerly a salesman for the Franklin-Ross Automobile Co., St. Louis dealers in the Franklin. During the war Adams was in the ambulance service in France, but later was transferred to the Lafayette escadrille. He was commissioned an ensign in Naval aviation service when the United States entered the war. Adams is a son-in-law of Paul V. Bunn, general manager of the St. Louis Chamber of Commerce, who is interested in the agency.

CHICO HOLDS AUTOMOBILE SHOW

Sacramento, Calif., June 6—The first annual Northern California Automobile show, held last month at Chico, proved the biggest success of any like event ever held in the northern part of the state.

Fifty different makes of cars, twenty-four trucks and a score of tractors, in addition to the accessories, were shown under three acres of canvas which housed the show. The event will be given each year, hereafter, but will be earlier in spring or in late winter.

Commerce Commission Works on Plan to Aid Automotive Shipments

WASHINGTON, June 6—Improvement in the distribution of freight equipment to the automotive industry has been reported to the Interstate Commerce Commission. While complaints continue to pour into the Commission's offices, the statistics compiled daily by the Car Service Committee of the American Railway Association and the terminal committee, show a freer movement of automobile freight.

The review of conditions for last week as submitted to W. C. Kendall, chairman Car Service Commission, again points out that fact that the demand for automobile cars continues to exceed the supply. Labor disturbances and consequent congestion has contributed in delaying the movement of this type of rail-

NO LIEN FOR DELAWARE GARAGES

Wilmington, Del., June 5—The Superior Court of Delaware has decided that proprietors of garages in the state have no lien on cars for their keep. The decision was made in the case of White Bros. vs. William J. Lokey and Harry Ellis, which was heard in the Superior Court here last week.

The case arose over the sale of a truck bought by Lokey from White Bros., who have a motor sales establishment in this city. On the car there was a purchase money lien of \$1000. Lokey was operating the truck and used space in Porter's garage, for which he agreed to pay \$5 a month. He got behind in his monthly payments on the purchase price and also in his garage charges, owing Porter two or three months. The latter had the truck levied on and sold for charges for its keep, and at the sale, which was conducted by Constable William Tinsman, it was bought by Ellis for \$375.

On the trial of the case, in which Lokey did not figure, except as a witness, White Bros. said they had no notice of the sale and Ellis said he knew nothing of a lien on the truck for purchase money. After hearing the case the court directed the jury to return a verdict for the plaintiff, White Bros.

The point on which the case was finally taken from the jury was illustrated by the citation of a New York case, which held that the garage proprietor had no lien on a car for its keep. The Delaware landlord's lien act was held not to include automobiles in the term "vehicles," therefore a verdict was directed returned for White Bros., who had the truck replevined when they heard of its sale. The point is that the sale for garage charges did not give title to the truck, under Delaware laws.

It is expected now that the garage proprietors of Wilmington and other cities in Delaware will get busy in an effort to have the legislature, now in session, pass a law for their relief.

road equipment. Instructions have been issued to the committee to give special attention to this movement in order that railroads owning automobile cars may get their property returned on their lines. There has been a speedier movement of freight through the important gateways which reflects the extraordinary effort being made to provide adequate car supplies to automobile factories.

ROME, GA., DEALERS ORGANIZE

Rome, Ga., June 8—The Rome Automobile association, including in its charter membership all the automobile and accessory dealers in the city, was formally organized here Wednesday night, June 2nd, at a dinner and organization meeting held at the Hotel General Forrest. Gordon Hight was elected first president of the organization; other officers are: G. E. Mays, vice president; Glover McGhee, secretary; A. E. Arrington, treasurer. The executive committee comprises the officers and B. A. Richards, Charlie Banks and G. C. Phillips.

TO EDUCATE PEDESTRIANS

Boston, June 5—A plan for educating pedestrians and motorists on the dangers of automobiling will be considered at a conference brought about by the proposal of Frank A. Goodwin, state registrar of motor vehicles and endorsed by the Boston Chamber of Commerce, the Massachusetts Chamber of Commerce and the Automobile Legal association. The purpose of this conference is to eliminate automobile accidents.

Speaking of the plan, Mr. Goodwin said that the figures on motor accidents for the first five months of 1920 were

Must Raise Bond Rate to Continue Work on California Highways

SACRAMENTO, CALIF., June 6—Highway work in California will be discontinued at the end of the present year, unless the electors vote at the November election to increase the interest on the \$40,000,000 issue of highway bonds voted a year ago, from 4½ per cent to a figure at which they can be marketed.

This decision was announced by State Highway Engineer Fletcher, after an appeal for such procedure had been made to Governor W. D. Stephens by the State Automobile Association and the Automobile Association of Southern California. These associations, realizing the bonds are not now salable, and that the cost of highway construction is about 100 per cent above normal, asked the governor to discontinue work until a dollar brings its former worth in roads.

The governor announced he wants a vote of the people on the matter, but no

appalling and would exceed any other previous year. "We have registered more cars since January of this year than we did during the entire 12 months of 1918. If freight facilities were in running order we would undoubtedly have more cars on the roads.

"Many accidents occur among children and old people. It is useless to talk to children. The best way to point out the penalty for carelessness in playing in the streets and not watching approaching cars is through the medium of the movies."

ACCESSORY CONCERN FORMED

Boston, June 6—E. J. Ashton and H. W. deVeir have formed a company of their own to market motor accessories, wholesale and retail, here. They are well known in the trade and have a wide acquaintance. Both men held responsible positions with some of the big accessory distributors here for several years, and know the merits of about all the good things on the market.

EQUIPMENT CONCERN ORGANIZED

Paris, Ill., June 7—The Paris Mfg. and Engineering Co., makers of piston pins, rocker arm studs, valve lifters and screw machine parts has been organized here with a paid-up capital of \$60,000. The officers are R. S. Lloyd, president; Horace Link, vice-president; Henry Crede, secretary and treasurer and R. W. Hayes, chief engineer and manager.

PHILBRIN IGNITION EXPANDS

Kennett Square, Pa., June 6—The Philips-Brinton Co. of this city, manufacturer of ignition systems, has been taken over by the Philbrin Corp., which will continue the manufacture of the present product. The Philbrin Corp. retains all the officers of the old company and increased capitalization will permit of addition factory space.

initiative measure has as yet been set in motion. Whether the people will vote on the question, or whether road building will lie dormant for three or four years, is uncertain just now.

In the meantime, all the previous contracts are being finished, and it is probable some of the counties will purchase the 4½ per cent bonds, losing the difference in that interest rate and the current price, in order that they may get needed highway constructed.

TRUCK SAVES THE DEALER

Hartford, Conn., June 6—A two-ton pneumatic-tired motor truck saved the situation for Russell P. Taber, a dealer here, because it enabled the firm to send a load of 200 rims from Hartford to the Reo factory at Lansing, where fifty trucks for the Hartford dealer were held up for lack of rims. When the factory

wired the Hartford dealer that there were no rims the house got busy and bought 200 rims in the east and then wired the factory of the purchase.

A two-ton Duplex left Hartford May 4 and arrived there May 9. The return trip was started the following Tuesday. A full load of parts was brought back and Hartford was reached Saturday afternoon.

The round trip was in the neighborhood of 2000 miles. The total expenses, including the driver's keep, was \$140, and of this amount \$10 was paid for a fine, as the driver had no mirror on the car. The parts brought back were badly needed at Hartford. Subsequently other trucks brought back parts and a side trip was made by one of the cars to Niagara Falls, where batteries and supplies were picked up for Floyd C. Standish, the Hartford U. S. L. distributor. The Taber establishment has become quite independent of the railroads to a large extent.

PLOWING ON BOSTON COMMON

Boston, June 5—An interesting plowing "contest" took place on Boston Common when about two acres of sodland along Lafayette Mall was turned over for reseeding. An old-fashioned plow was brought in a heavy two-horse wagon, with two men attendants, and by way of comparison the power plow, which was a Midwest Utilitor, came along with one man driving and drawing a small platform truck to carry its harrowing blades. Four power machines could have been placed in the same space used by the horse-drawn equipment.

The speed of plowing was about 25 per cent greater than that of the horses, with only one man working the machine as against two on the plow. It was necessary to rest the horses each furrow, but not the Utilitor.

Boston Truck Men Working Out Plan to Systematize Truck Freights

BOSTON, June 6—Inter-city motor trucking has reached the point where systematization is necessary and steps to that end are being taken in Boston. Value of keeping trucks in motion continuously with their rated loads is recognized. All well managed fleets are operated upon this basis, hauling finished goods one way and raw materials on the back trip.

But it is difficult for trucking concerns, engaged in the longer inter-city hauls, always to secure loads and therefore the one-way load has had to bear the charge of the entire trip. Return load bureaus in different cities have helped to eliminate waste of this sort and truckmen are accustomed to advertise for return loads in the newspapers.

The idea that is being followed here is to bring about a co-operative arrangement among shippers of goods and among owners of trucks whereby, while continuing individual ownership and operation of the vehicles, they will work in a systematic manner with much the same effect as if they were all owned by one great concern.

Shippers will be furnished with trucks when they want them, and with as many as they require, and the owners of trucks will be supplied with profitable loads every day and on both out-bound and in-bound trips. Efforts will be made so as to route shipments that unnecessary duplication of trips will be eliminated.

Members of the Motor Truck Club of Massachusetts, composed of truck owners and people otherwise interested in highway transportation of merchandise,

have taken the initiative in this matter, though not as a part of the activities of the club. About 25 owners of trucks, mostly engaged in general haulage, have recently formed the Motor Transportation Bureau, with headquarters at 112 Water st., where Dwight W. Sleeper is in charge as manager. It is a co-operative bureau maintained by responsible motor trucking concerns for the purposes of furnishing trucks to move all loads and locating loads for idle trucks. An employment bureau is another adjunct.

There is no extra charge for the service. There is only the standard charges to the concern which transports the load.

The Boston movement is simply to secure the co-operation of responsible truck owners and shippers of freight for mutual benefit. It is a part of the plan to arrange regular lines radiating from Boston to points throughout the state and to open freight depots for the reception and classification of less than truck-load lots. The possibilities for improved service and for the elimination of unnecessary costs are great, and it is certain that the economic development of the road transportation system will bring about improved conditions which will stabilize and establish the business of motor transportation.

CUT HARTFORD CAR CREDITS

Hartford, Conn., June 6—There is considerable uneasiness among Hartford automobile dealers at present due to the action of local banks in curtailing credits. On authority of one of the oldest and soundest of the local establishments money is tight insofar as the banks are concerned. Considerable business is being done on paper and discounting notes has become something of a lost art. There has been a depressed spirit manifested by some of the dealers during the past two or three weeks, but the general opinion is that things will be all right before long. Sales are being made in very satisfactory fashion but the future has many of the dealers worried.

NATIONAL PARKS ROAD EXTENDED

Charles City, Iowa, June 5—The North Iowa Pike extending from McGregor across the state into So. Dakota has been changed to National Parks Pike and will extend to the Yellowstone Park in one direction and Milwaukee in the other. Plans for marking the road will be perfected this summer. The part extending through this county is now closed for paving. C. P. Ell of Rudd in this county, editor of the Rudd Review, will complete arrangements to issue a small journal for the association.

Contracts have been let for the paving of more than forty miles of this branch of the highway this year.

Minneapolis Also Has a Parking Problem Awaiting Solution

MINNEAPOLIS, June 7—Provision for a material reduction in the number of automobiles which may be parked in the downtown loop district is contained in a new parking ordinance passed by the city council recently. Elimination of all parking in the center of streets and substitution of a parallel-to-curb system with intervals of five feet between cars for the former diagonal-to-curb parking are the essential features of the new ordinance. In addition, there will be a no-parking space of thirty feet in the center of each block to permit passengers to get on and off vehicles.

This change is a compromise since the original ordinance was aimed to prohibit all parking within the loop district, a proposal strenuously opposed by retail merchants. The new ordinance will be given thirty days' trial and in case it does not prove satisfactory, it is probable that the original, more drastic measure again will be considered.

Parking in the center of Seventh Street for a distance of one block in the center of the theater district was opposed by the heads of the police and fire departments.

That the adoption of the New York City system of regulating street traffic by means of signal towers may follow if it proves satisfactory in the present experiment was indicated by the superintendent of police.

GETS SIX MONTHS FOR SPEEDING

Wilmington, Del., June 6—Holding that, although he had no criminal intent, when his car ran down and killed Raymond B. Kelley of Chester, Pa., March 25, on the road near Wilmington, John J. McIvor, a Philadelphia automobile dealer, was found guilty of criminal negligence, because his car was exceeding the speed limit, the Court of General Sessions here, sentenced him to six months' imprisonment.

Minneapolis Dealers to Hold School for Women

Driving and Maintenance Courses to Be Given by Automotive Men to Fair Customers

MINNEAPOLIS, June 6—What is said to be the first free school for women drivers of automobiles ever attempted is being conducted by the Minneapolis Division of the National Safety Council in co-operation with leading dealers and distributors. The course, consisting of five lectures and demonstrations, aims to give instruction in driving, mechanical operation and traffic regulations and recognizes "the desire on the part of women automobile drivers, not only to lessen accidents, but to establish a reputation for Minneapolis as a city having the most efficient women drivers in the country."

Topics covered include rules of the road, teamwork on the street, traffic rules and regulations, hazards and accident prevention, lectures and demonstrations on the practical mechanics of cars and demonstrations of proper driving. The speakers include Hon. Julius A. Schmahl, secretary of state, Superintendent of Police J. F. Walker, Judge Mathias Baldwin of the municipal court, Walter Milnor, head of the department of Automotive Service of the Dunwoody Institute, Walter Wilmot, manager of the Minneapolis Auto Trades association and L. M. Browne, vice-president of the Gray Motor Co.

At the next meeting, each "pupil" will be requested to indicate the make of car she drives, distributors having agreed to provide a chassis and demonstrator for each for the following session which will be in charge of Mr. Wilmot. The subject of this lecture-demonstration will be "What You Should Know (Mechanically) About Your Car." After his talk, each woman driver will have opportunity to go directly to the make of car which she uses and obtain advice from the demonstrator provided and to go over the mechanical details with an expert. The last session, under the direction of Mr. Browne, will be a practical demonstration of the proper handling of cars by women.

Some of the direct results of the course have been the clearing up of many legal points regarding traffic regulations and liability for accidents and damage, a better understanding of the responsibilities and obligations of drivers both in city and country, and the formulation of ten "commandments" to guide women motorists. These are the following:

Do not window shop while driving.
Watch traffic carefully.

Do not expect right of way from men.

Do not park at fire hydrants.
Use hands to signal turns at street intersections.

Use the proper hand.
Watch the traffic officer—that's what he is there for.

Learn the peculiarities of your car.
Attend the automobile instruction school for women drivers.

A part of each session is set aside for queries which have indicated by their variety and the seriousness of the women the keen interest which the course has aroused.

Following the second of the lectures, it was found necessary to change the place of meeting from the Woman's club to the National Guard Armory to accommodate the increased attendance. Though the course was launched by the local division of the National Safety Council assisted by automobile men, the move has had the endorsement and support of women's clubs, the local newspapers and the police department.

SET CAR STORAGE CHARGES

St. Louis, June 5—The Industrial Warehouse Co., a \$25,000 incorporation, whose stock is held by members of the St. Louis Automobile Manufacturers and Dealers' association, has begun the storage of motor cars. The following rates have been established:

Passenger cars, under 125-in. wheel base, \$5 a month.

Passenger cars, 125-in. wheel base and over, \$6 per month.

Truck chassis of all description, 7 cents per month per sq. ft. of floor area occupied, using overall measurements on each car.

The rates are lower than exist in St. Louis. The warehouse is located in East St. Louis, Ill., just across the Mississippi River. Frank W. Sudholt is general manager of the warehouse.

DEALERS DICTATE POLICY

Rochester, June 8—In the formation of the Seldon Advisory Council by the Seldon Truck Corp. in this city, the corporation is going further to bring the dealer and the manufacturer closer together. The advisory council, a plan worked out by T. C. Boulden, vice-president of the concern, will consist of Seldon dealers and salesmen, the representatives being selected from eleven different districts. These representatives must be either dealers or dealers' salesmen. No member can hold office for longer than one year.

The council will be a governmental body in reality, the Seldon Corp. permitting these men to come in from the firing line and give their advice on construction and selling. To be a representative from a district will be the highest honor that a dealer or a dealers' salesman can possibly expect to have. It will mean being the direct connection between the factory and every dealer and salesman in that territory on all matters pertaining to the selling of motor trucks. To fill such a big place is going to mean profits personally greater than can be quickly grasped.

While other manufacturers have formed similar organizations, with an official of the concern in charge, the Seldon firm will attempt to have the dealers dictate the policy of the concern, and not the company itself.

Eastern Road Work Is Badly Hit by Freight

"Not Even In War Were Materials So Hard to Get" Asserts Connecticut Highway Commissioner

HARTFORD, Conn., June 6—"Not even during the war was the state highway department so badly handicapped by reason of its inability to procure materials for the maintenance of the highways of the state as it is at present," said Connecticut State Highway Commissioner Charles J. Bennett. The commissioner went on to say that it was impossible to keep the improved roads in repair and that they will soon be unfit for travel unless relief in railroad transportation comes soon.

The result will be seen in the hindrance of motor truck traffic if not its entire discontinuance, it is pointed out, as it will be impossible to operate trucks over roads out of repair, the commissioner declared. The operation of passenger cars will be seriously interfered with.

Road materials are hard to get and some extremely important work is now held up that was to have been finished early in the summer, because cement cannot be secured. Sixty-five carloads of materials are in transit somewhere, but they cannot be obtained under present conditions. Recently a barge load of material was secured from New Jersey and discharged at New Haven, but this method proved rather expensive. The commissioner emphasized the good work done by trucks during the freight strike and the benefit to the country at large, but the continuance of this good work will depend wholly on the arrival of the needed materials.

HARPER AT FORT WAYNE

Fort Wayne, Ind., June 8—One of the snappiest and most interesting meetings ever held by the Fort Wayne Automobile Dealers' association was staged recently at the Fort Wayne Country Club when the association had as its honor guest H. B. Harper, a former resident of Fort Wayne, who is now residing in Philadelphia and who at the present time is the president of the National Association of Automobile Dealers. Mr. Harper came to Fort Wayne at the invitation of the local association.

PHILADELPHIA GARAGES ORGANIZED

Philadelphia, June 8—The Philadelphia Garage Association has been incorporated and the 250 members now write "Inc.," after the title of their organization. The election of officers has resulted in George G. Blind, proprietor of the Mercury Garage, being again chosen to head the list. Isaiah A. Dionne has been elected vice president and the offices of treasurer and secretary have been merged as to duties, John R. Fox, secretary since the inception of the organization, now acting also as treasurer.

Milwaukee Dealers Give Saturday Half Holiday

Close Salesrooms and Service Stations at Noon to Conform With Practice of Other Business

MILWAUKEE, Wis., June 7—Salesrooms, service stations and repair shops of all members of the Milwaukee Automotive Dealers' association are closing promptly at 1 p. m. on Saturday during June, July and August, to conform with the general policy adopted by most local industries and business houses to close about noon at the week-end. Notice of the early closing was given the public in large display advertisements, signed by the association with the names of its fifty-five members subscribed below.

"The automotive trade is simply asking for its employees the same consideration that employees of other trades are being given by the public," said a statement issued by Bart J. Ruddle, executive secretary of the association. "We are therefore asking the motorists of Milwaukee to co-operate with the service stations in the matter of having adjustments or repairs made so that delivery of cars can be made from the stations in time for the week-end country trip at 1 p. m. Saturday. The full-week schedule will go into effect again on Sept. 1."

On Monday, May 31, stations were closed all day, and the same will be done on July 5.

AIR LINE ACROSS CONTINENT

Milwaukee, Wis., June 7—Transcontinental passenger service by aerial liners capable of carrying twenty-six persons, will be instituted about Aug. 15, between New York and Chicago by the Lawson Airline Co. of Milwaukee, which is the pioneer builder of commercial aircraft in the United States. The service originally was intended to start July 1 or 15, but it will not be possible to complete the first ships in time.

Alfred W. Lawson, a widely known aircraft engineer, established a small shop in Milwaukee about two years ago to develop a biplane on the largest scale yet attempted. This was completed in the summer of 1919, and after being perfected here, was taken on its maiden voyage to New York City. The trip was successful. In New York and Washington Mr. Lawson and his staff carried more than 400 passengers without accident, returning after six weeks' absence to Milwaukee to arrange for the construction of a considerable number of air liners.

FRENCH ROADS AT CONVENTIONS

Boston, June 8—To carry the gospel of good roads to the Republican and the Democratic conventions, and to urge favorable action looking toward the construction of a complete system of great national roads, Charles Henry Davis, president of the National Highways As-

sociation, left Boston to-day on a transcontinental motor car trip. He is using the same car in which he has traveled hundreds of thousands of miles in advocacy of good roads.

Accompanied by his chauffeur he left Boston in the early afternoon and expects to reach Chicago several days before the opening of the Republican convention. The car is decorated with good roads signs and is loaded with good road and national highways literature to be used at the conventions and along the route.

After the Republican convention Mr. Davis will continue westward with the intention of being in San Francisco when the Democratic convention meets the last of next month. Three years ago, Mr. Davis made a round trip across the continent of 8236 miles, driving the same car in which he started to-day.

INVESTIGATE MOTOR ACCIDENTS

Detroit, June 5—A police bureau to investigate all traffic accidents in an effort to minimize them is getting the hearty support of the Detroit Automobile Club, the Detroit Automobile Dealers' association and automobile executives. Vigorous prosecution of reckless drivers, who have been responsible for many accidents and the unusual number of fatalities within the last few months, resulted in the establishment of the bureau. In line with suggestions at recent conferences an ordinance is to be introduced in the council providing for governors on trucks and commercial cars that will limit the speed to 12 miles an hour.

It is the contention of the authorities as well as automobile manufacturers, dealers and owners that reckless driving alone is responsible for 95 per cent of the accidents caused by motor vehicles. A special court has been assigned to handle such cases, and Judge Marsh, who presides, has evinced a determination to enforce strict adherence to the letter of the law in the sentencing of reckless drivers and persons driving and riding in motor vehicles while under the influence of liquor, to jail terms without the option of a fine. In a statement outlining the functions of the new bureau Police Commissioner Inches and Superintendent Rutledge declared an automobile or truck was safer than a horse driven vehicle, if handled by a competent and careful driver with due regard to traffic laws.

TO BUILD NEW SHOW BUILDING

Rochester, June 8—The managers of the Genesee County Agricultural Society will erect a \$15,000 building to be used for the exhibition of automobiles in connection with the fair at Batavia, near here, this year. The building will be 25 by 50 ft. Automobile races also will be held on the first day of the fair.

When the building was first talked of the managers thought of spending \$30,000 for the structure, but many changes were made in the revision of the plans, so that the building can be erected for half that amount.

The Old Camel Story As Applied to Mechanics

Hartford Employer Finds That Treating Workers Well Only Results In Fresh Demands

HARTFORD, Conn., June 6—A Hartford automobile dealer, thinking he was making life worth while for his employees, posted a notice of a profit-sharing bonus and one-half hour after the notice was put up a committee of the repairmen presented a petition asking for a half-holiday Saturday, during the warmer months at least. The dealer was given time to think over the matter and he replied to the effect that inasmuch as more cars were used in the summer than at other seasons, therefore more people needed service than at any other time.

He refused the half holiday Saturdays on these grounds. The working force walked out with the exception of three men. The dealer then called in repairmen from his other branches and soon learned that the force that walked out actually did him a good turn. The dealer paid good wages.

FREIGHT AIR SERVICE IN EAST

Wilmington, Del., June 6—The Curtiss Aero Motor Corp., in connection with a summer seashore service, to include Atlantic City, N. J., is seeking a 100-acre tract on the Delaware river near Wilmington for an intermediate landing place. It is expected to carry freight, as well as passengers.

DEALERS IN ECONOMY RUN

Sacramento, Calif., June 6—The First Annual Reliability and Economy Run of the Sacramento Motor Car Dealers' association, will be held June 21 and 22. The run will be from Sacramento to Talla, 109 miles, on Lake Tahoe, around the lake to Tahoe City, and back on the northern lake route, a total distance of almost 250 miles.

Twenty cars already have been entered in the event and the list is likely to reach about thirty. Several cups have been offered, chief among which is the perpetual sweepstakes cup hung up by The Sacramento Bee.

ACCIDENT MARS EASTERN RACE

* Rochester, June 8—One minor accident marked the opening of the automobile racing season of the Liberty Speedway association which were held on the Brockport track on Memorial Day. While tuning up before the races started two motorcycles collided on the three-fourth turn and one was wrecked. A sidecar rider was seriously cut about the head and face.

While making a turn, in the three-mile race, Johnny Ryan's car went against the fence, ripping off a couple of wheels, but Ryan rolled safely away.

A new track record was set in the half-mile dash when Art Bartold went around in 38½ seconds.

N. A. C. C. Holds Annual Meeting and Sets Show Dates for 1921

NEW YORK, June 8—Considerable slowing down in the automobile business, in keeping with the present general trade tendency; a 25 per cent curtailment in production due to the inability of the makers to get material shipments; the tightening of bank credits and the fuel shortage in some sections of the country were conditions recognized and discussed at the annual meeting of the National Automobile Chamber of Commerce held in the Commodore Hotel here to-day.

The dates for the 1921 passenger car shows were set. The New York show will be held in Grand Central Palace, Jan. 8-15. The Chicago show will be in the Coliseum, Jan. 29-Feb. 4.

There will be no national truck shows this winter. By a large majority the truck manufacturers agreed that truck shows such as the ones held in the past have not been satisfactory. While no definite plans were made, there is a possibility that some kind of demonstration of truck ability and service will be held during the spring.

Means of overcoming the difficulties of transportation were given considerable attention. Reports from the factories showed that more than 68,000 cars and trucks were delivered over the highways to dealers in May, which eclipses the previous record of 61,000 in April. Although there were indications of a considerable improvement in general freight conditions; the manufacturers pointed out the necessity for a continuance of the

large volume of drive-ins as a means of ensuring deliveries.

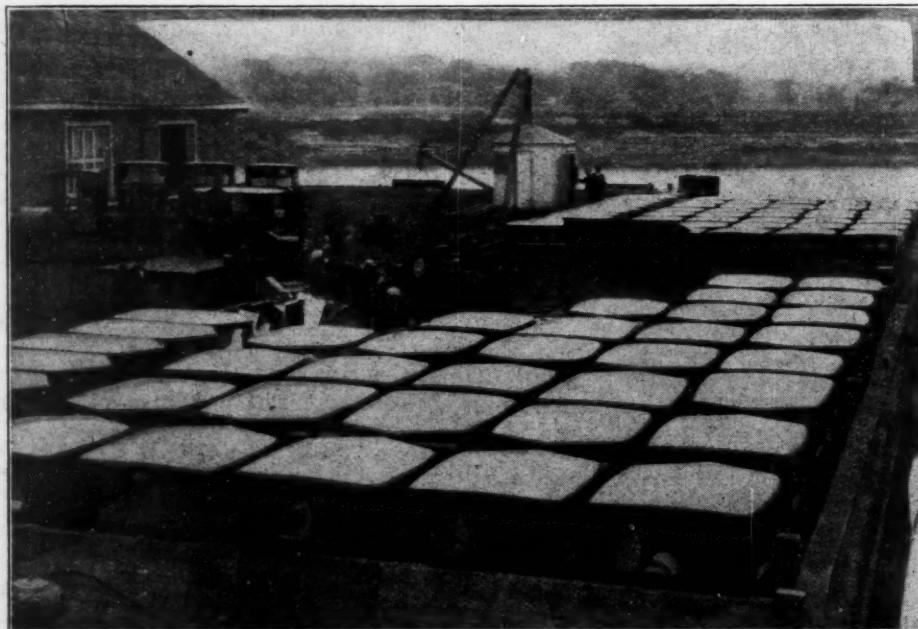
It was pointed out that in any event the dealers are not going to be able to get all the cars they want this year, and any they do get should be sold on a strictly business basis. There was no indication that a reduction in prices may be expected for many months, and there was a warning that there was no need for the dealers to get into the position of the clothing and shoe people through their policy of cutting prices to move their products.

The motor truck was advocated for all short haul business as a means of helping the railroads by relieving them of what has been termed unprofitable business. This enables the railroads to handle the long haul traffic with greater efficiency and greater profit.

Through the National Automobile Dealers' association the meeting was supplied with reports on general business conditions from more than twenty large business centers throughout the country. These reports showed that while there was a general trend toward curtailing credits on automobile business, as well as in other lines, there was very little tendency to discriminate against the automobile industry. All of the reports indicated that the dealer who conducts his business on a sound basis will get every consideration from the banking interests.

Governor Miller, of the Kansas City Federal Reserve district reported to the meeting that the discrimination in that

Bringing Bodies to the Factory



Here is how the Franklin Automobile Co. is getting its Sedan bodies. The shipment was made over the new New York State Barge Canal from Buffalo to the Franklin factory in Syracuse

district was due to the fact that the milling, wheat and oil interests were sorely pressed for money and that the banks will continue to curtail the credits for the automobile business until the conditions return to normal.

Welborn, governor of the Atlanta district, in response to a query from the N. A. C. C., said that he believed money should be advanced for truck, tractor and utility passenger car business, but not for automobiles for recreational purposes. It was reported that financial assistance to the discount companies had been curtailed 25 per cent.

It was made evident that the gasoline situation was one that required care and economy for a number of months at least. The present shortage in crude oil is a temporary situation, the members were told, like the shortage in many other commodities, and until the increased drilling brings greater quantities of oil, it is not unlikely that the demand will cut into the reserve stocks. It was shown that the rising cost of gasoline was not a great problem with the average motorist who uses about 300 gallons a year. A five cent increase per gallon means an added cost of \$15 to \$20 per year in the operation of the car.

Placing self-starters on trucks, the more careful adjustment of carburetors and the increasing mileage efficiency from the modern cars and trucks, coupled with the increased production of gasoline, which is certain to come with increased drilling, is expected to bring about a normal situation within another year and place the price of gasoline again below 30 cents a gallon.

TRACTORS HELP FARM LABOR

Wilmington, Del., June 6—with farm labor so scarce that even an offer of \$6 a day and board fails to draw help to assist in planting the crops on Delaware farms, several farmers of this state are endeavoring to solve the problem through the use of tractors. With the use of a tractor, the farmer can drive it himself, drawing a stout harrow, which plows and harrows the ground on each trip across the field. This plan also reduces the cost of labor, only one man being needed to operate both machines.

George Daniels, a New Castle county farmer, is believed to have been the pioneer in this matter here, and because of his success, a score or more of others are following suit. They report that the work is done in a highly satisfactory manner at a greatly reduced cost.

MILWAUKEE CUTS PRODUCTION

Milwaukee, Wis., June 7—Milwaukee, as one of the principal centers of the automotive parts industry in the United States, is feeling the effects of the reduction program of passenger car manufacturers of the country. Since June 1, operations in numerous large plants are gradually being restricted, production declining to 60 or 65 per cent of capacity, which up to this time has been held variously at from 85 to 100 per cent, dependent upon supplies of raw materials

and ability to make deliveries through the railroad traffic tangle. The release of men is being accomplished gradually without upsetting conditions. The situation of the automotive parts industry is not different from several other principal industries in Milwaukee. The boot and shoe factories have reduced production to a much more marked extent and tanners likewise are running at greatly reduced schedules.

TEXAS DEALERS VISIT FACTORIES

Detroit, Mich., June 8—Texas automobile dealers to the number of 125 are guests in Detroit on a tour of the factories. The party, which came to the Indianapolis race as guests of the Fort Worth Star-Telegram, was brought to Detroit to be given opportunity to see the product they sell in the making. The visitors were entertained at luncheon today at the Board of Commerce following which they were taken to several of the factories, as guests of the Detroit Automobile Dealers' association. The party includes virtually all of the dealers in Fort Worth and the immediate vicinity, and their visit to Detroit was prompted in a great measure by a desire to urge Fort Worth as the distributing center for the southwest.

FARM TRUCK TOUR FOR BUFFALO

Buffalo, June 6—A farm truck tour will leave Buffalo for a 600 mile two weeks' tour on June 14. It is expected there will be assembled for the tour the largest fleet of farm demonstrating trucks ever assembled outside of a New York or a Chicago show. The Motorcade will be an educational tour. Trucks will go into the fields and orchards and will there be demonstrated under real working conditions. Tents will be carried as the cavalcade is expected to be so large as to overtax the capacity of some of the smaller communities in which stops will be made.

A band and representatives of the Buffalo Motor Truck Dealers association will accompany the cavalcade.

California Dealers Ask for an Investigation of Gasoline Prices

FRESNO, CALIF., June 5—Expressing its belief that the present gasoline shortage in California is artificial and the possible fore-runner of a price increase, the California Automobile Trade association, at its annual meeting to-day, called upon Attorney General Palmer to investigate the situation in an effort to afford relief to the Automotive business of the Pacific Coast. The two California Senators and eleven Representatives were also urged by telegraph to get behind the movement.

A week ago to-day the restrictions were imposed. The automobile clubs of the state accepted the statements of the oil companies and through the newspapers got behind the rationing movement. The result has been extreme difficulty in operating cars. Dealers upon the advice of the oil companies have refused to sell any except minimum quantities of fuel and motor transportation particularly of passenger cars, has been badly hampered. So serious is the situation that it was the principal topic at the association's annual meeting, and action was decided upon when isolated cases of a peculiar nature were pieced together in the meeting. One dealer stated that a certain paint shop in Los Angeles has painted 1,000 filling station price signs for the Standard Oil Co. quoting gasoline at 30 cents. It is now 23½ cents. This assertion was followed by the suggestion that the propaganda concerning the alleged shortage may have been preparatory to a price increase.

Another dealer, speaking on the subject of a shortage of tank cars, said nineteen cars were spotted beside a refinery and that only one was filled, and that one stood four days on a siding before it was moved. Another dealer told of a car of gasoline which paid demurrage for four days on a siding while the sur-

rounding country was crying for fuel. From many spots throughout the state come statements and rumors about oil wells which are capped, holding the crude oil in the earth. Another dealer said the oil companies had complained of a lack of steel for building refineries, but that there seemed to be plenty of steel for erecting filling stations for retailing fuel.

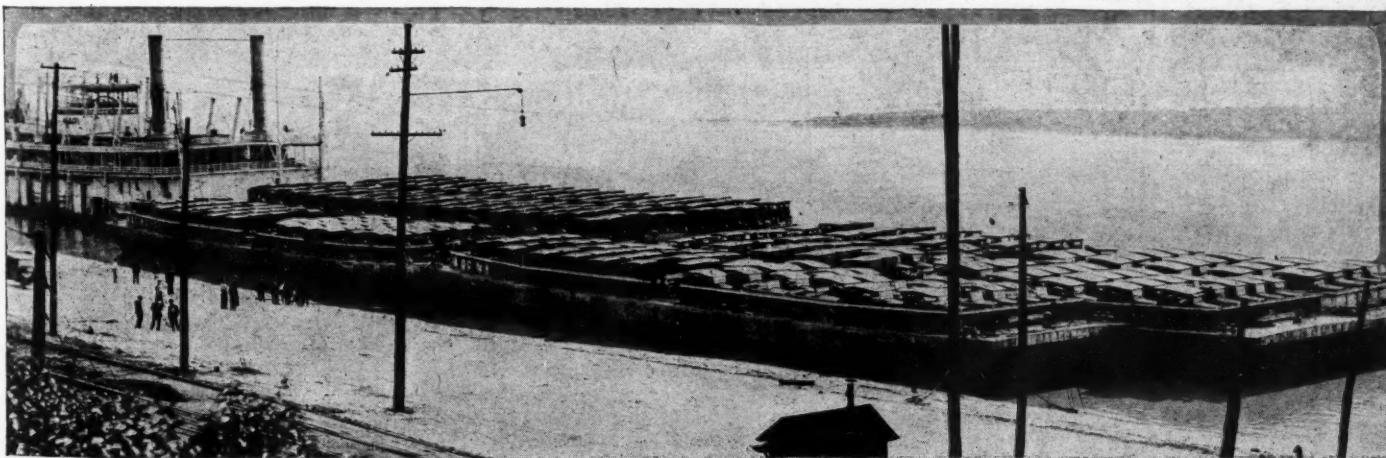
With all this information in hand, the association decided that the most logical plan of action would be an appeal to the Government which was made in the following telegram to the Attorney General:

"Because of claims by certain oil companies that there is a shortage of gasoline, a system of rationing gasoline has been put into effect by certain oil companies and a great injury is being done to all business in the Pacific Coast States. However, evidence in hand leads to a general belief that the shortage is artificial and that the present propaganda will be followed by an increase in price. We appeal to you to have instituted an investigation or hearing in California to the end that full publicity may be given to the facts and justice assured to all. Three thousand business firms, members of the California Automobile Trade association, pledge their support in any investigation you may undertake in this situation, which is costing merchants millions of dollars."

It is also stated by dealers in Oakland that one of the independent oil companies has plenty of gasoline but cannot supply it because the needed terminal facilities are controlled by rival companies.

Following the appeal to the Government, a committee was named to gather data on the subject.

Shipping Cars Down the Mississippi

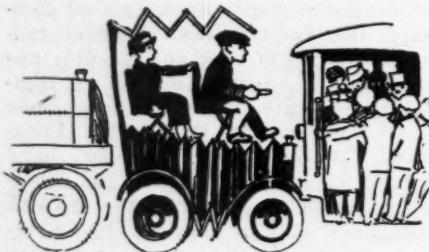


Here is a striking view of how the waterways of the United States are being used to supplement the railroads in delivering motor vehicles. It shows six barges loaded with cars which went from Cincinnati to Memphis in about three days for a fraction of what the railroad freight bill would have been. Such shipments recently have been of increasing frequency.

Traffic Problem Becoming Increasingly Important

Industry May Have to Aid Municipalities in Formulating Codes to Relieve Present Congestion

If these United States still harbor any survivors of the quest of perpetual motion, the present traffic situation in the larger cities offers them an exceedingly lucrative field for their talents. For if they will only devote their time to the perfection of a motor car with a collapsible wheelbase they will reap royalties which will make the avaricious dreams of the perpetual motion age seem like a 1914 salary bucking 1920 living costs.



For, truth to tell, the collapsible wheelbase seems to be about the only solution of the traffic problem as it exists in our larger cities to-day. There is an alleged joke in vaudeville about the manufacturer of a certain well known car who is considering putting wheels on the rear end of his cars so that he can run them on end and so get more of them on the streets. But if you watch the stream of motor traffic in any of our large cities at the "rush hours," you will realize that that joke isn't so all-fired funny after all.

Something must be done. Anyone can tell you that. They'll nonchalantly remark "they oughtta do something" just as they used to declare "we oughtta have a law." But constructive criticism along traffic lines is another thing. The traffic authorities of the larger cities are staying awake nights trying to devise means whereby the tremendously increased automotive traffic of the last decade can adequately be taken care of.

Two of the largest cities in the United States, on opposite sides of the continent, have been brought face to face with the traffic problem recently, and

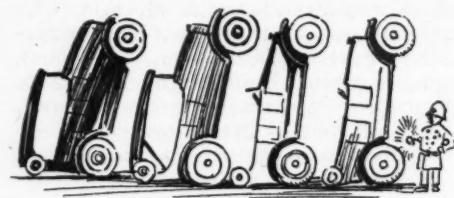
are taking means to combat it. Los Angeles has already started to solve its problem by the passage of new traffic ordinances. New York is contemplating new laws governing vehicular travel. And Chicago is continuing to wrestle with the problem as she has been wrestling since the notorious Hector was a pup.

Los Angeles recently put into effect an ordinance which absolutely prohibits the parking of motor vehicles in that part of the city known as the business district. The California city does not rank with Chicago or New York in mere size, but the tremendous number of tourists attracted there, the large number of cars owned in proportion to the population and the fact that the streets are relatively narrow makes the traffic problem there assume proportions commensurate with those of the larger cities.

In addition to forbidding the parking of automobiles in this district during certain specified hours, Los Angeles also has mapped out certain of its streets designated as being forbidden to certain turns. Left hand turns from some of these streets are forbidden, while right hand turns are forbidden from others. The traffic authorities believe these regulations will considerably simplify the situation and considerably reduce accidents.

travel in the other direction will have to do so on a parallel street. This one-way street suggestion is in effect in many cities and has proved to be one of the most efficacious remedies for congested conditions.

Chicago's traffic problem is a perennial affair, due to the fact that the main retail and business district of the city is confined in an area less than half a mile square. This means that a great many more than 1,000,000 persons are in that small area every day in the week

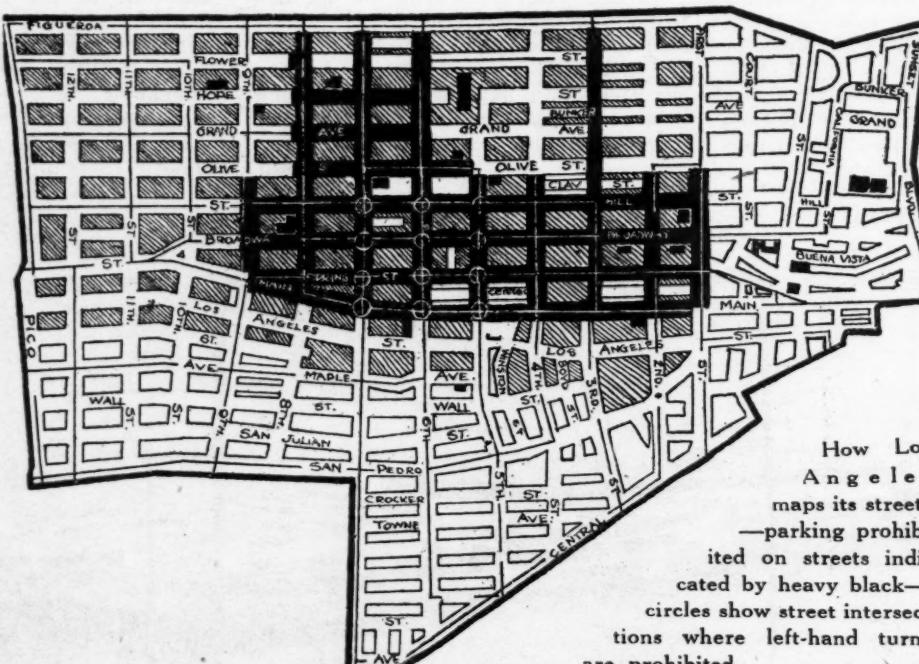


and that most of them require some sort of transportation to bring them there. One may well imagine the congestion in that district, therefore, during the "rush" or "peak" hours.

To the normal congestion, however, has been added a large proportion of "through" motor traffic en route from the south to the north sides. For several months certain streets have been closed to vehicular traffic for part of its downtown traverse and this has, therefore, been shunted onto the busy loop streets. Conditions have been almost unbearable for months past, and unless some means are adopted to reduce the congestion, they will be quite so when warmer weather brings out its greater motor traffic.

Chicago years ago adopted the Los Angeles plan of prohibiting parking in the downtown district, but even this has proved scant relief. Even cars stopping to load or unload passengers cause tieups, which, while they individually may amount

to little, in the aggregate almost completely tie up traffic. One-way streets here would do little good, for it is crossing rather than opposing traffic which causes most of the trouble.



How Los Angeles maps its streets—parking prohibited on streets indicated by heavy black circles show street intersections where left-hand turns are prohibited

New York has under consideration the proposal to make one of its main arteries a one-way street. That is, all traffic on this street will be limited to travel in one direction. Vehicles wishing to

travel in the other direction will have to do so on a parallel street. This one-way street suggestion is in effect in many cities and has proved to be one of the most efficacious remedies for congested conditions.

Factory Advertising Men Fight Publicity Ruling

Edict of New York Publishers Is Chief Subject of Managers in Detroit Convention

DETROIT, June 8—Advertising managers from all the automobile and truck factories in and around Detroit at a meeting last week named a committee of six, headed by H. C. Dart of the Paige-Detroit Motor Car Co. to co-operate with a similar committee from the New York Automobile Dealers' association and other committees, which will seek modification of the ruling of New York newspapers eliminating automobile publicity. Short talks were made by several of the advertising managers, the burden of all of which was that revenue derived from automobile advertising is the third largest in the industrial world, in view of which fact it was contended that the automobile industry was being discrim-

inated against in favor of picture shows, theaters and other industries.

H. T. Gardner, executive secretary of the New York association, came to Detroit to explain to the factory advertising managers what he termed was the unjust attitude of New York dailies, publishers of which have issued a hard and fast ruling prohibiting the mention of the name of an automobile or an automobile company in the news columns. He urged that the factory executives co-operate with the National Automobile Chamber of Commerce, the accessories and parts manufacturers and allied interests in the effort to have the ruling rescinded or modified. Ward Canaday of the Willys-Overland Co. said the situation was similar to that which existed in Boston a year ago, which had been changed as a result of the combined efforts of the automotive manufacturing executives and dealers, and contended that a dignified and truthful presentation of all the facts would suffice in the present instance to secure at least a modification.

All of the manufacturers admitted they were more or less to blame in the amount of purely advertising matter which had been dumped into the newspaper offices as publicity, and they were a unit in admitting the justice of the attitude of editors in throwing out much of this propaganda, their only grievance lying in the fact that they felt the publishers had gone to the extreme in eliminating all mention of the name of factories or cars.

C. A. Brownell of the Ford Motor Co. urged a "go-slow" policy, and contended it was the best plan not to quarrel about other industries, but to show the merits of the automobile industry and logical reasons why so many millions of people are interested in news of the industry and the different makes of cars. Brownell drew a sharp line between news and advertising, and declared the reason prompting the publishers to a great extent was the purely advertising matter sent out as news. He said the word publicity was overworked by some advertising managers.

In Which Bull Plays a Leading Role



UTICA, N. Y., June 8—This is a bull story pure and simple, and yet every word is true.

J. E. Clark, Utica distributor for the Maxwell and Chalmers cars, had an extremely exciting experience one day last week, on the state road, just north of Clayville. He was driving a Chalmers car near the outskirts of the village, when three men driving a herd of cows, with a large and ferocious bull in the lead advanced toward him. One of the men signaled for him to stop, and he did. First Mr. Clark was of the opinion that the men figured he might run down the foremost animal, which he judged to be a valuable thoroughbred, but which proved to be a very dangerous bull of the Holstein Freisan family.

As the pastoral monarch approached the automobile he was noticeably ill at ease, and upon getting within a few feet of the machine lowered his head and lunged forward, his horns denting the license plate and pushing the radiator back against the driving shaft. Backing

up after the first impact, the animal prepared to attack from a different angle, but Mr. Clark thought it was about time that the Chalmers made a move, and shifting into low, stepped on his accelerator and dashed toward the hesitating bull. The front of the machine struck him sideways and rolled him over into a ditch, where he was later subdued and finally shot by Mr. Stappenback of this city.

The Bull Comes Back Again

Mr. Clark's companion in the machine was preparing to take to the field, when the animal started the second onslaught, but reconsidered and watched the battle between car and beast from the tonneau, remaining standing so that he might vacate at time should it become necessary. The men in charge of the stock were watching with interest, from behind a nearby fence, stoutly constructed of barbed wire.

Had the bull been successful in plunging at the car from the side, it would have been doubtful if the car

could have withstood the onslaught, and would likely have resulted in severe injury to its occupants, as occurred in a similar accident a little over a year ago. The animal was the property of a farmer near Clayville, who disposed of him to Utica dealers, owing to his ugliness. He weighed 2400 lbs., and was five years old.

The animal had frightened a child, just previous to the arrival of the automobile, and not being hobbled in any way, was free to put the full force of his ton and more of flesh behind every attack. It was reported that the same bull was responsible for the death of a man, sometime ago, and Mr. Clark is being congratulated by his friend in his narrow escape from injury, as is his friend who was with him.

Many workers at the Clayville Knitting Co., who saw the affair corroborated Mr. Clark's story. The purchaser of the bull paid Mr. Clark for the damage to his machine, which was a brand new one, being delivered to a branch dealer.

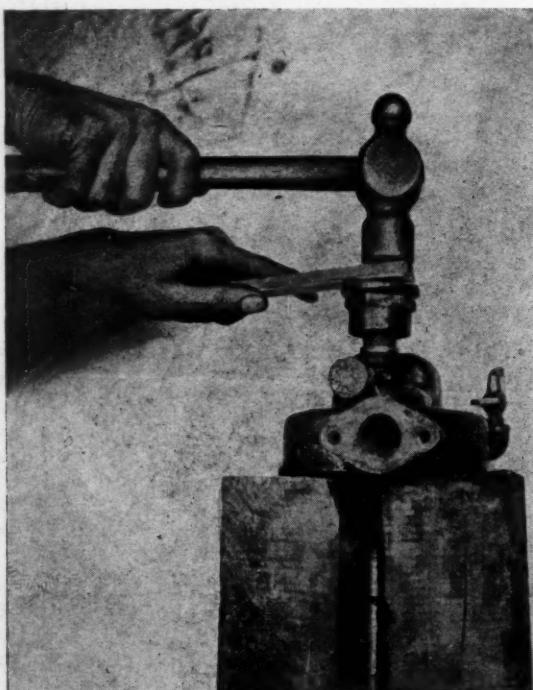
Standard Mechanical Operations in Tractor Service



by John Charles Thorpe, M.E.
and Gustav Howard Radebaugh

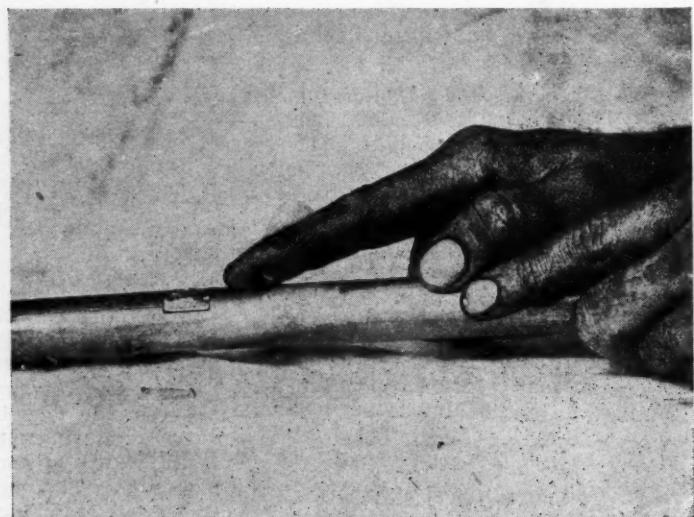
EDITOR'S NOTE: The two pages herewith are the eighteenth of a series covering the service operations on tractors, although the same can be applied quite generally to passenger car and truck engines. In the last article in MOTOR AGE we concluded the operations necessary to repair or replace a faulty pump impeller. This installment involves the repair of the key way and fitting new key in pump shaft. The views should be studied closely, and the tools used as shown. The operations are depicted in the approved manner and should be followed to secure the best results.

PART XVIII—THE COOLING SYSTEM

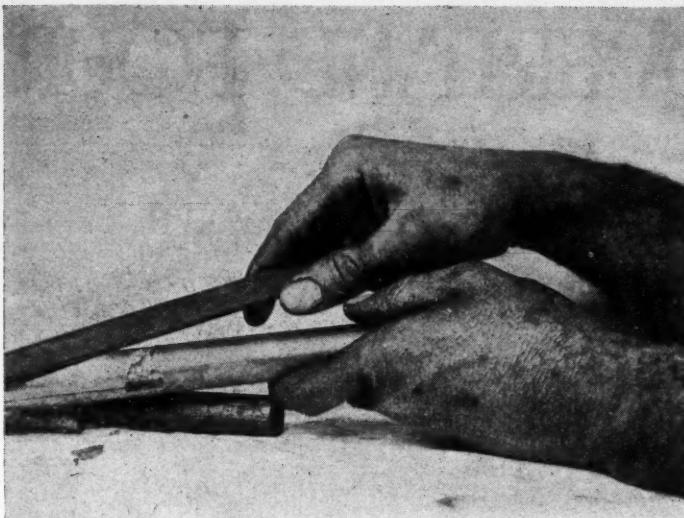


1—To remove shaft from pump housing, set the assembly on blocks as indicated, being careful to see that it is solidly supported; tap gently on coupling with light machinist's hammer, holding a piece of lead or bar of solder over coupling to prevent damage to the part. This is to loosen the shaft in its bearing. It may be withdrawn and the impeller removed for inspection. The housing is usually made of cast iron and will break or crack if undue pressure is applied to the shaft

Engine overheats, fires intermittently or will not develop power, because of improper circulation of water through the cooling system. The illustrations in this article deal with the repair of the key way and fitting new key in pump shaft



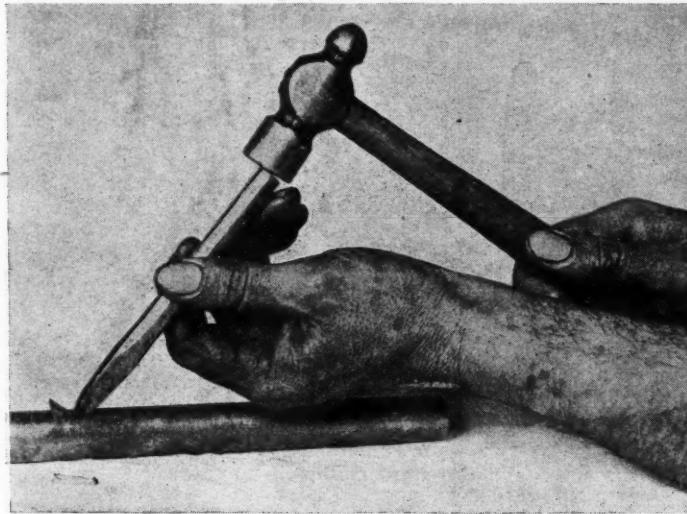
2—Observe the sheared off key in the shaft. If the key has been broken for some time it will be worn quite smooth and flattened over the edge of the keyway



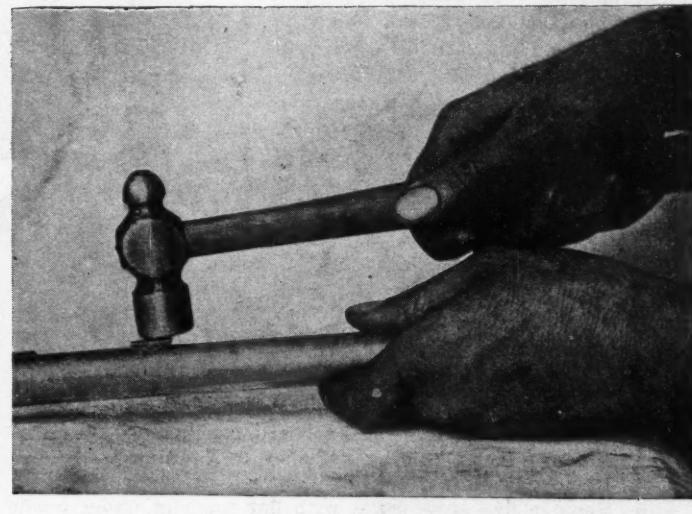
3—It is probable that the surface of the shaft will be badly scored and perhaps chipped out by the break. Observe the scars on the shaft adjacent to the key way



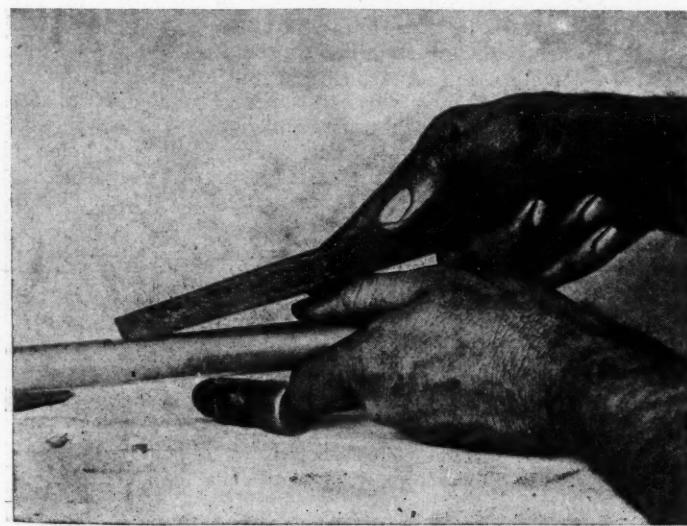
6—The type of key used in this fastening is known as the Woodruff key, and may be had in all sizes in any garage, supply or hardware store. After measuring key way, select and fit key in its seat



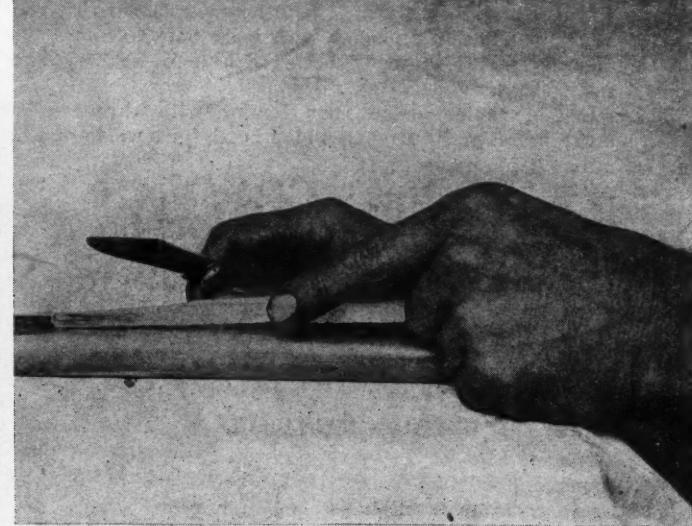
4—The broken key may be removed by chipping out with a cape chisel. Care should be exercised in this operation to see that the shaft and edges of the key way are not damaged



7—Set key solidly in shaft by tapping with light hammer. Care should be exercised in this procedure to be sure that edges of key are not battered or scored



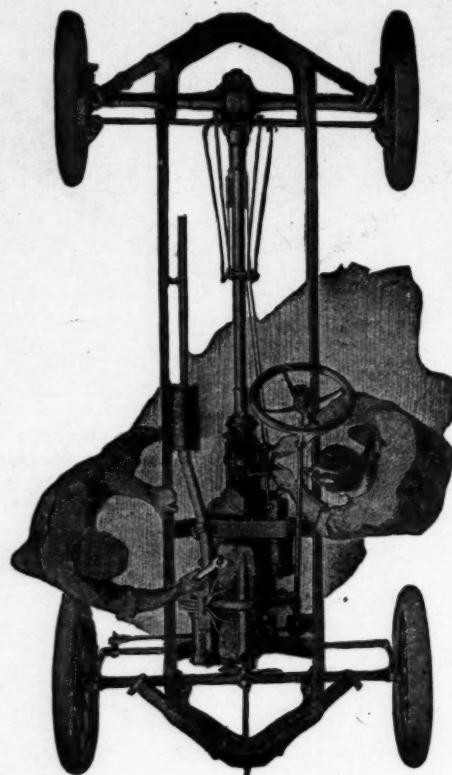
5—After the broken key is removed the key way should be carefully dressed down with a fine flat file. This same operation should be performed upon the key seat in the pump impeller



8—It is possible that it may be necessary to dress down the key with a file in order for its height above shaft to correspond to the depth of the seat or key way in the impeller

SERVICING THE OVERLAND FOUR

THIS is the last of a series of articles dealing with the service operations on the Overland Four. The work as it stands has been prepared by the Willys-Overland Co. and the dealer will find at the head of each operation the amount of time required to do the job. The operations have been put down in a step-by-step method so that one operation is logically followed by the next. This makes it possible for the service man to have on hand all the necessary tools and equipment before beginning the job. Incidentally, the time limit set for the job affords a ready means whereby the skill of the mechanic can be judged. Other things being equal it should not take a man longer to do a certain job than herewith mentioned, as the service department of the factory has established these limits after much experimenting. Dealers who are not keeping copies of MOTOR AGE on file are suggested to do so to get the benefits of this series.



TO REMOVE AND REPLACE RUNNING BOARD FRAME SPLASHER

1. Remove four $\frac{1}{4}$ -in. nuts and lock washers holding running board to fenders.
2. Remove four $\frac{1}{4}$ -in. nuts and lock washers holding running board to running board bracket.
3. Remove tacks holding splasher to running board.
4. Remove running board.
5. Remove five stove bolts with flat washers under heads holding splasher to front fender.
6. Remove three $\frac{1}{4}$ -in. stove bolts, nuts and lock washers holding splasher to rear fender.
7. Remove two $\frac{3}{8}$ -in. body bolts holding body to frame.
8. Pry body up slightly and pull out splasher.
9. Pry body up slightly and install new splasher.
10. Line up holes in splasher with body bolt holes.
11. Install two $\frac{3}{8}$ -in. body bolts with lock washers and nuts. Tighten securely.
12. Assemble splasher to rear fender with three $\frac{1}{4}$ -in. stove bolts, plain washer under head, lock washers and nuts. Tighten securely.
13. Assemble splasher to front fender, using five $\frac{1}{2}$ -in. stove bolts, plain washer under head, lock washers and nuts. Tighten securely.
14. Assemble running board to running board bracket.
15. Put on four lock washers and four $\frac{1}{4}$ -in. nuts. Tighten securely.
16. Assemble front and rear fenders to running board with four $\frac{1}{4}$ -in. lock washers and nuts. Tighten securely.
17. Tack splasher to running board.

Time: 1 hr.

TO REMOVE AND REPLACE RADIATOR.

1. Remove hood.
2. Drain radiator through petcock at bottom.
3. Remove front splasher and radiator shell by unscrewing the one $\frac{1}{8}$ -in. cap screw, two $\frac{3}{8}$ -in. cap screws and two $\frac{1}{4}$ -in. stove bolts.
4. Disconnect battery cable at battery to prevent short circuit. Disconnect wires from lamp sockets and pull

Time: 45 min.

lamp wires through shroud and radiator shell.

5. Remove lamp stay bar.
6. Remove $\frac{1}{8}$ -in. nut from radiator stay rod at radiator bracket.
7. Remove two $\frac{1}{8}$ -in. bolts, nuts and lock washers from starting crank bracket at radiator.
8. Remove two $\frac{3}{8}$ -in. radiator holding down bolts.
9. Loosen radiator hose clamps.
10. Remove radiator.
11. If new radiator is to be installed, assemble hose on radiator manifolds.
12. Install radiator.
13. Tighten radiator hose clamps.
14. Put in two $\frac{3}{8}$ -in. radiator holding down bolts.
15. Assemble starting crank bracket to radiator with two $\frac{1}{8}$ -in. bolts, lock washers and nuts.
16. Connect radiator stay rod to radiator with $\frac{1}{8}$ -in. nut.
17. Assemble front splasher and put on radiator shell, lacing front lamp wires through shroud and radiator shell, also replace battery cable.
18. Line holes in splasher and radiator shell with holes in frame, and with one $\frac{1}{8}$ -in. cap screw, two $\frac{3}{8}$ -in. cap screws and two $\frac{1}{4}$ -in. stove bolts, fasten assembly to frame.
19. Connect lamp stay bar.
20. Connect wires to lamp sockets.
21. Fill radiator.
22. Replace hood.

TO REMOVE AND REPLACE WINDSHIELD GLASS.

(Upper or lower).

Time: 15 min.

1. Tilt section from which glass is to be removed.
2. Remove screws from windshield sash frame end.
3. Pull out glass.
4. Pull out glass cushion.
5. Place cushion on glass and insert both cushion and glass together into windshield frame.
6. Replace windshield glass cushion end and screw tightly into position.

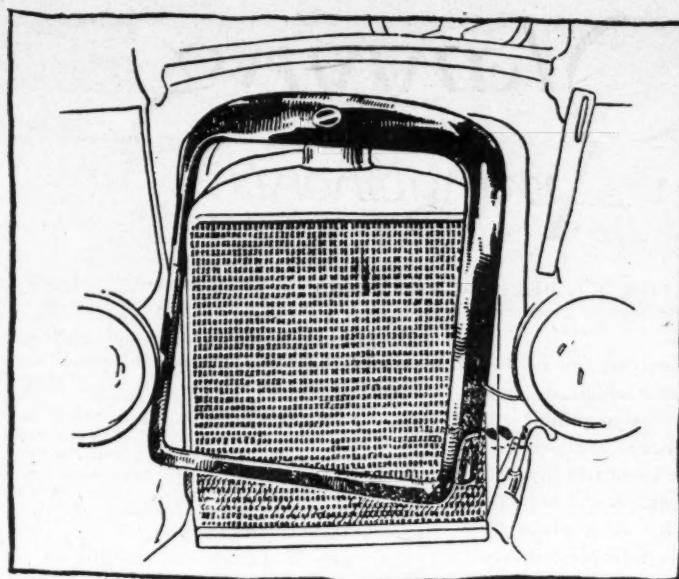


Fig. 33—Removing radiator shell

TO REMOVE AND REPLACE UPHOLSTERY. Time: 10 min.

1. Remove front seat cushion.
2. Pry out upholstery pads from sides of seat.
3. Remove rear front seat pad.
4. Remove rear seat cushion.
5. Pry out side pads.
6. Remove rear seat pad.
7. Install rear seat rear pad.
8. Install rear seat side pads.
9. Put in rear seat cushion.
10. Put in rear pad on front seat.
11. Put in side pads on front seat.
12. Put in front seat cushion.

TO REMOVE AND REPLACE WINDSHIELD

Time :15 min.

1. Lay back top.
2. Remove nuts from lower end of windshield uprights on the inside of cowl.

3. Remove windshield being careful not to disturb the windshield upright rubber which is glued to the cowl.
4. Replace windshield, being careful not to disturb the windshield upright rubber which is glued to the cowl.
5. Replace nuts in lower end of windshield uprights on the inside of cowl.
6. Raise top.

TO REMOVE AND REPLACE SPEEDOMETER HEAD.

Time: 15 min.

1. Disconnect speedometer cable.
2. Remove three screws, lock washers and nuts holding speedometer head to instrument board.
3. Push speedometer head through instrument board.
4. Place speedometer in position on instrument board.
5. Screw to instrument board with three screws, lock washers and nuts.
6. Connect speedometer cable to speedometer head.

TO REMOVE AND REPLACE INSTRUMENT BOARD LAMP.

Time: 8 min.

1. Remove two screws, lock washers and nuts holding lamp to instrument board.
2. Push lamp out of instrument board.
3. Disconnect wires from lamp.
4. Connect wires to new lamp assembly.
5. Place lamp in position on dash.
6. Fasten lamp to instrument board with two screws, lock washers and nuts.

TO REMOVE AND REPLACE RADIATOR SHELL.

Time: 18 min.

1. Remove hood.
2. Remove radiator cap.
3. Remove two bolts, nuts and lock washers holding radiator shell to frame.
4. Disconnect lamp wires from lamp sockets and battery cable.
5. Pull wires through shell.
6. Connect wires in lamp sockets, replace battery cable and put on hood.

Small Engines Cut Pit Stops In Half

(Concluded from page 13)

camshaft was placed in position, but this did not seem to improve conditions very much.

At the forty-first lap Art Klein retired with a broken steering knuckle lever. This was the beginning of the steering gear trouble. Klein's Frontenac overturned when the steering lever let go and wrecked the car beyond repair for that day.

The next three or four stops were made for gasoline and oil, but the next stop for mechanical trouble was made by the Meteor, and steering gear trouble was the cause. The car came into the pits with the mechanic holding the steering knuckle on one side with his hand, and on the other side with his handkerchief. When the steering lever let go the tie rod suffered, with the result that both of these members were replaced. This was the fifty-fourth lap for this car. After this, steering gear trouble occurred regularly. While it is true that Chassagne in the Ballot suffered steering gear trouble also, this trouble was not the fault of the gear.

On the back turn Chassagne was placed in the predicament where he had to run into the wall or take to the grass. He chose the latter alternative and his tie rod suffered.

Examination of the steering lever on car number seven, the Frontenac, driven by Benny Hill, showed that a progressive fracture had occurred in the steel. The breakages of steering mechanism were of an unexpected nature. The grade of steel used in these parts was not at all suitable to the purpose. Steel used in steering gear levers should bend but should not crack off brittle, and this is what most of the cars experienced. Accidents of this type prove very dangerous, and it seems that had more metal been provided to take the strains, the cars would have made even a better showing than they did. Weight saving by reduction of metal at places where stresses mount to maximum is poor policy.

The Duesenberg number twenty-nine, driven by Eddie O'Donnell, came in for a new set of plugs, and after a general

inspection, started off without one of the plugs. The plug was hastily replaced and then started off. The Revere, piloted by Henderson and later by Tom Alley, was the victim of much valve trouble. Alley had the rocker-arms off, and the valve guides out. He reamed out several guides, did a little general rebuilding, but the car still persistently missed. Tommy Milton in the Duesenberg ran for a considerable time on a broken valve spring.

On the whole the cars made a very creditable showing. Last year we made a plea for the smaller engine. With the coming of the reduced sized power plant we have found out that performance has actually been bettered. Engines of 183 cu. in. piston displacement, which is only slightly larger than the Ford engine, can be made to develop over 100 hp. Applying some of these principles to our stock car engines we should soon have power plants of greater enduring qualities, capable of exerting a tremendously large effort with a minimum of fuel consumption. The question of economy must soon be of paramount importance and the small-sized engine will greatly aid in the ultimate solution of the problem.

Garage Planning Service Station Arrangements

No. 230

Would like to have suggestions as to arrangement and sizes of office, workshop and storeroom. The lot is in an old quarry, which is about 15 ft. deep. Will have to build the wall up from bottom giving a basement under entire garage. Street in front is only entrance to garage. We intend living upstairs in front, using a space 50 by 28 ft. Town of about 1400. Only garage in town and should carry full line Ford parts, tires, tubes and accessories. Mostly Ford repairing and battery and ignition repairing.—Walter Born, Born's Garage, Le Claire, Ia.

If you intend storing cars in your basement you will be obliged to install an elevator. The only desirable location for the elevator is as indicated on our plan. If placed at the back, it divides the shop, and if at the side, a turntable would be necessary. For your own use some sort of hand elevator would be sufficient with cables arranged on the showroom side, so as not to interfere with passing cars when not in use.

The balcony can be reached from the stairway which communicated with your second floor apartment, or you could use a light stairway hinged and balanced like a fire escape, which can be pushed up out of the way when not in use.

With the limited amount of room at your disposal it would be well not to divide off any space for a shop, but keep your shop equipment concentrated.

CONDUCTED BY TOM WILDER

MOTOR AGE is receiving many inquiries for garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage, and readers are urged in asking for such plans to be used to include the following information:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

nace, etc., to be built of cement blocks or tile with no posts between showroom and workshop.

About two cars in showroom, one desk in office. Proposed garage for small town of about 1500, on direct trail to large city of 100,000, only four miles away.

One story building wanted with provision to add another story, if an attractive front can still be maintained. Expect to employ three men. Corner lot, being first building on a square. Car entrance is possible from side, account of corner lot.—G. Mahannah, Peoria, Ill.

You are fortunate in having a lot located on a corner, as it is decidedly impractical to use such a narrow space for garage purposes, where an aisle must extend lengthwise.

You will be obliged to use posts in the garage space when you build the second floor, and on account of the close quarters, the concrete filled steel variety will be best, being the smallest.

There will be more trouble finding a location for an elevator convenient for both floors than any other feature of your addition. If the remainder of the block is still vacant it would be greatly to your advantage to secure more property rather than attempt to build another floor.

If you could get the rear 50 ft. of the adjoining lot or lots, then you would have good storage space on the first floor using the space immediately behind the office for shop and the 50 by 80 ft. at the rear for storage.

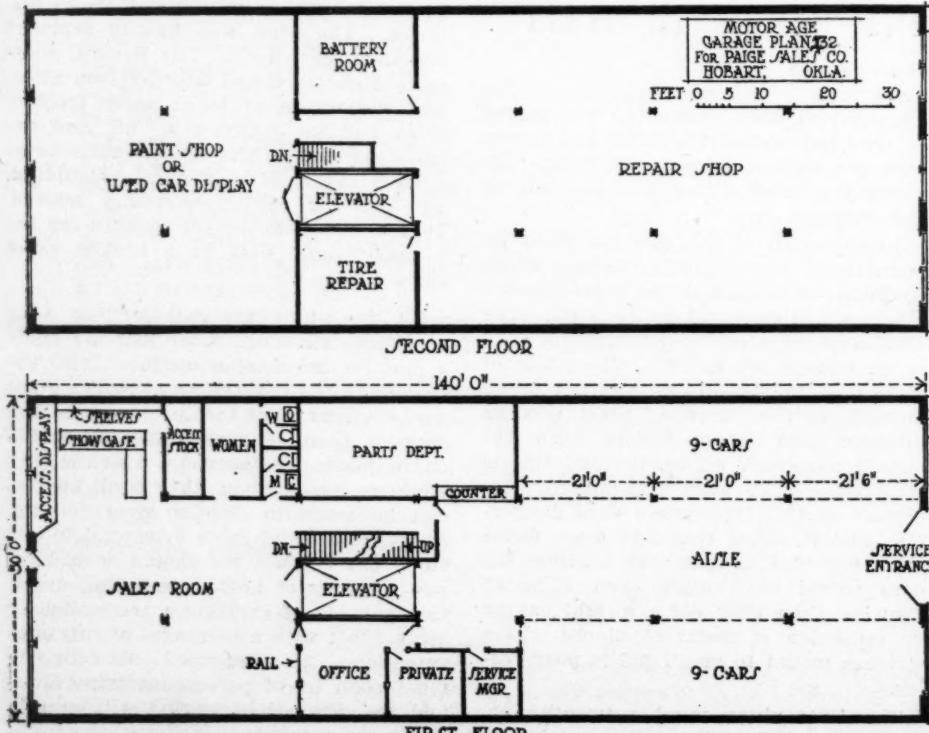
No. 231

Give plans and specifications for a garage 40 by 100 ft. showing front elevation, showroom, office, accessory department, toilets, washracks, workshop, fur-

MOTOR AGE
GARAGE PLAN No. 22
FOR PAIGE SALES CO.
HOBART, OKLA.

FEET 0 5 10 20 30

REPAIR SHOP



No. 232—Two-story sales and service arrangement

Please send us drawing of plans for what you consider a modern sales, service and repair plant to be built two stories, with repair department on second floor. This building will face west and will have access at the rear. Dimensions 140 by 50 ft.

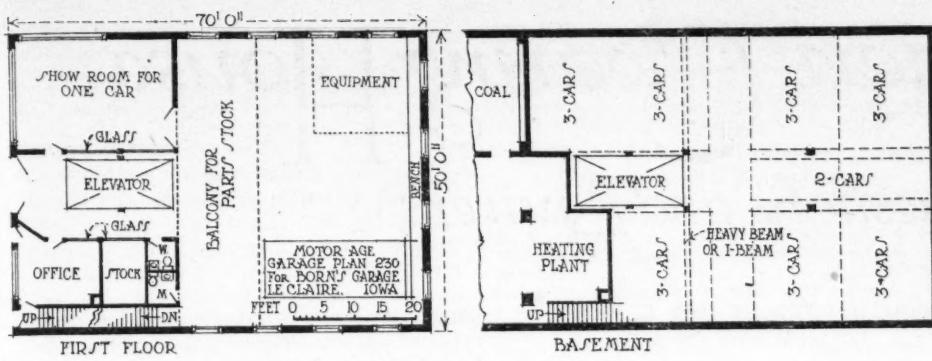
We would like to handle all parts on the ground floor, if that be advisable, also would like to have an outer office, one private office and women's rest room, as well as the showroom.—Paige Sales Co., Hobart, Okla.

The tendency of late is to divide sales and service, and in view of this it would be best to draw a more or less distinct line across the center of your building, confining all sales activities to the front, and all service to the rear.

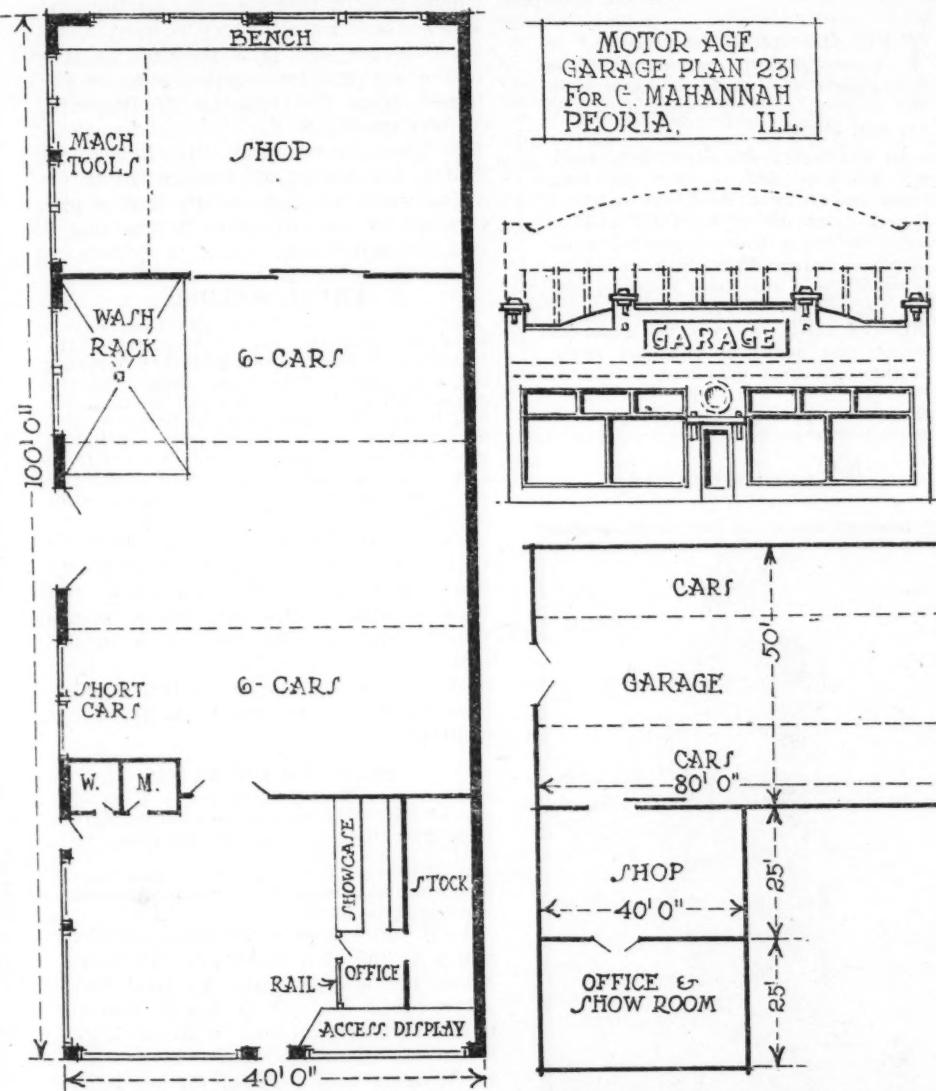
Customers seeking service will enter at the rear, consult the service manager for advice, or estimates on repairs, and in no way come in contact with the sales department.

Buyers, likewise, cannot see or be influenced by anything happening in the service department.

For the same reason, it would be well to reserve the front part of the second floor for used car showroom, reached by customer via stairway or elevator without going through the service department or shops.



No. 230—Basement used for storage



No. 231—Garage and repair shop 100 by 40 ft., showing front elevation

OFF THE MAIN STREET BUT MAKING GOOD

(Concluded from page 15)

may ring it without alighting from his machine. The door opens automatically.

For rendering constant service, many practical if not altogether novel systems have been instituted, and which through a thorough trial have proven to be most satisfactory are listed in the service schedule offered by the Worthington Garage.

When the garage was first opened it was customary to offer free delivery and calling for cars. But this proved more of a detriment than an asset and was discontinued. The reasons for this were,

first, the exposing of the motor car to collision when not in the hands of the owner, creating serious ill-feeling, and, secondly, the necessity of employing such a large staff of delivery men as to make the proposition an unprofitable one. Patrons would ask for their car and not receiving it within ten or fifteen minutes would wonder why they were being neglected. The present system of having every owner take his own car in and out is believed to be the best.

A second element of service is courtesy. Every employee in the service of the establishment is rasped continuously with the spoken admonition to be courteous. It is found to be profitable.

Then comes the washing and cleaning. All motor cars that are stored in the Worthington Garage are cleaned and washed daily. Patrons who come to take their machine out on a nice day like to see the nickel shining and the body well polished. It adds respect to the establishment that houses the cars, Mr. Cohn says.

Electric appliances have been installed for cleaning cars and are found to offer a uniform result with better and more efficient service. With the use of two of the vacuum cleaners and electric water sprays more than 300 cars can be washed and cleaned in one night.

Another feature of the service which, however, is not uncommon, is the gasoline and oil supply. Patrons can obtain their gasoline and oil needs before starting out for the day and without paying cash for the liquids, the amounts being charged against their monthly accounts. This has added much favor.

Convenience for the Owner

The topic of minimizing inconveniences is one which the owner lays much stress upon. Regardless of what the service a patron demands, his wants are filled with as little inconvenience to him as is possible. Every discomfiture is carried as a burden on the shoulders of the staff of workers. "The patron is never to blame" is the slogan adopted, and has proved here to be of the utmost benefit to the garage ultimately. Despite the discontinuance of a delivery and call system, if the circumstances demand it, a delivery man will be taken from his work and sent out with the car to a patron's home. It is the instilling of humanitarian elements into the service that has counted, Mr. Cohn averred. "The public has an opinion that the garage man and the repair man is a robber," he said. "We must do everything possible to eradicate this sentiment. Garage men have a world of things to live down, and by inculcating the feeling in the patronage that you are trying at all times to satisfy them without taking their last dollar is the spirit which ultimately will bring us back into popular favor."

Many garages fail in the employment of efficient labor, is the opinion of this proprietor, because they either hire insufficient or inefficient labor and advisors. The Worthington Garage has a corps of fifteen workers, mechanics and advisors to constitute its staff. These men are constantly kept in touch with existing condition by weekly or monthly consultation and meetings.

Men who are inefficient, are slouchy in their methods, are dropped before their lack of energy has resulted in the loss of a patron.

One of the causes for their success is attributed to the fact that at all times, regardless of the season of the year, enough men are at the garage to take care of any exigency.

The present structure was erected at the cost of \$60,000 five years ago and affords a ground area of 15,000 sq. ft. The erection of a third floor will cost in the neighborhood of \$15,000.

The Readers' Clearing House

Questions and Answers

SHOCK ABSORBER

Q—Explain in detail the operation of the Westinghouse shock absorber.—R. S. Gibson, Currie's Garage, Monessen, Pa.

The Westinghouse shock absorber is the air spring or plunger type. It consists of an air chamber made up of two sections, one of which telescopes into the other. The outer section is attached to a bracket on the frame of the car. The inner section is attached to one end of one of the springs. The chamber is partly filled with oil through the filling plug hole under the cap M Fig. 1. The filling plug is fitted with an ordinary Schraeder tire type of air valve through which the chamber may be charged with air at any desired pressure. The oil in the chamber seals the packings of the telescoping joint and prevents the air from leaking out. The mechanism inside the chamber is a small oil pump which is worked automatically by the up and down flow of oil past the flat piston D whenever the air spring is compressed or expanded. A small amount of oil which is always passing the packings when in motion keeps them thoroughly lubricated. The surplus drains into a collecting pocket, and the automatic oil pump delivers it back into the cushion chamber. The oil passage surrounding the piston V is purposely restricted in order to retard the quick reaction of the spring. All of the time the spring is in action, air is being drawn in through filtering material in the breather and blown out through suitable passages in such a way as to keep the telescoping joint free from dust and dirt.

FRICITION SHOCK ABSORBER

Q—Illustrate how the Hartford shock absorber works.

2—What is the price of a set for a 5-passenger Buick?

3—Is it true that Tommy Milton broke DePalma's world record? What make car?—Herman Meyers, East Moline, Ill.

1—The Hartford shock absorber is of the friction type. All of the movable frictional parts offer a constant resistance to the vibration of the spring both ways, and it is easy to see that when the wheel strikes an obstruction, the arms come together, but instead of flying back as the free spring does, it is retarded by the friction and moves gradually to its normal position. The friction is always the same while the tension of the spring diminishes as it approaches its normal position. When the wheels strike an obstruction in the road the tendency is to move the axle up and to push it back. Due to the vertical component of force the spring oscillates in a vertical direction and will continue to oscillate until the tension of the spring diminishes and the spring as-

CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age

THIS Department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by some one else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

Miscellaneous

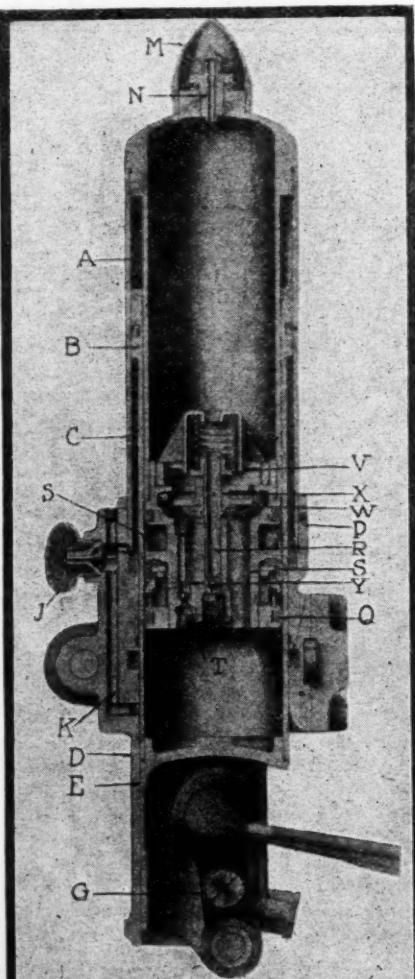


Fig. 1. Sectional view of the Westinghouse shock absorber

sumes its normal position. With this type of shock absorber the spring rebound is forced to work against friction which aids in retarding the oscillations which would follow after the impact.

2—We are not in a position to give prices but the information can be obtained from the Edward V. Hartford, 35 Warren St., N. Y.

3—The record made by Ralph De Palma was beaten by Tommy Milton on a Duesenberg. Full details and a picture of the car appeared in the May 6 issue of Motor AGE.

FRAME WELDED

Q—A motor car frame has been shortened by cutting five inches from the middle of each side rail and then welding the cut ends together by means of the oxy-acetylene torch. A good looking job was done, the frame channel being welded on both the outside and inside. What is your opinion of such a job? Would it be apt to break under heavy road shocks or continued stresses of many miles running?—F. A. Tyron, Piffard, N. Y.

This kind of a job ought to stand up very well as we have known cases where the frame has been shortened and welded together and has broken in another place and the weld held up all right. Changes of this kind have been made on racing cars and surely it must be a pretty safe method or it would not be done.

PLUNGER OIL PUMP

Q—A 1917 Kissel 38 seems to have only one check valve in the plunger oil pump. How can this pump supply pressure with only one check valve?

2—What is the gear ratio and horsepower of this model?—William A. Mason, Washington, D. C.

1—If you examine the pump carefully you will find that there are two valves. When the plunger lifts the inlet check valve opens and oil is drawn into the pump cylinder through a filter screen. When the plunger descends, a check valve opens and permits the oil in the cylinder to pass out into a main distributing duct.

2—The gear ratio of this car is 4.58 to 1 and the S. A. E. horse power rating is 31.6.

LUBRICATING OIL TROUBLE

Q—Is there any remedy for preventing the oil in the crankcase of my 1918 Ford equipped with a Holley manifold from becoming diluted? The car has been driven about 6,000 miles. The car seems to have good compression, as the engine is turned over slowly and after it has passed center the compression will turn the engine over till the next piston begins to compress, as a rule the car does not start easily. It is necessary to spin the engine, pull out the choke, thus giving it a heavy charge of gas. After putting fresh oil in the crankcase, it requires only about two weeks driving to take all the life out of it causing the clutch

The Power Plant

TORQUE

Q—Publish the torque and horsepower curves of the Franklin 9-B.

2—Of the 6-cylinder 1918 Reo N.

3—Desire some information as to the nature of "torque," as I am somewhat confused by the fragmentary explanations I meet in automotive journals. I believe that I am right in assuming that the torque is expressed in pounds, is the measure of rotating force and is obtained numerically by multiplying the force in pounds applied at the end of a rotating arm by the length of the arm.

The brake horsepower of a gasoline engine varies within working limits directly with its speed, the augmenting of its power resulting from the increased momentum imparted to the fly-wheel.

The torque, however, cannot so vary. The pressure on the end of the arm (crankshaft) is practically that exerted by the force of the explosion in the chamber. I don't know under what conditions this pressure is recorded, but I presume that a resistance is maintained of a degree just below that sufficient to stall the engine. However that may be, it would appear that under normal conditions that pressure cannot vary greatly and hence there can be no increase in

torque at varying speeds, since an increase in resistance would stall the engine and a decrease would manifest itself in accelerated speed. Whatever variation might be apparent would be due to casual factors such as friction and vibration.

The practical conclusion is that the torque curve is the better indication of an engine's performance at low speeds, in hill climbing and in acceleration, whereas the brake horsepower indicates rather its reserve power available for the production of high speeds.

As a matter of fact, the performing ability of a car is so extensively dependent on factors other than engine power, weight, friction, gears, etc.—that neither the torque nor the horsepower curve may be accepted as informative.

I have written this at length not to show how much I know about "torque" but to make apparent the gaps and limitations in my knowledge so that I may the more readily be set right.—H. W. Smith, Annapolis, Md.

1-2—The horsepower and torque curves of these two cars are not available.

3—You have very adequately ex-

pressed the difference between the two quantities "torque" and "horsepower." Horsepower with a gasoline engine is a factor that depends upon engine speed not directly and exclusively, but closely enough to be so interpreted within certain limits.

Torque, however, is a quantity that in the ideal gasoline engine is a constant quantity. With an engine (ideal) where such factors as resistance of the flow of gas through the manifold, wire drawing, uneven expansion and contraction within the gas passages, do not enter the torque curve would be absolutely flat. This condition also assumes that the gas mixture will ignite and burn within the infinitesimal part of a second. However, using concrete materials, we are immediately placed within certain physical limitations. The effect of the passages on the mixture itself is to reduce the velocity of the flow. When the speed of the mixture gets up to a certain high rates, about 200 ft. per second, the friction is so increased that the gas velocity is reduced considerably. Then the volumetric efficiency of the engine is reduced to the point where the torque curve breaks.

However, neither the horsepower nor torque curves alone tell the story. One must have both of them to properly interpret the engine action. In truth, with a tractor engine the torque is the more valuable. Tractor engines will develop something like 230 lb. ft. of torque say for the average engine, while the horsepower developed will be more than 50. With a motor car engine the horsepower developed will be in excess of 86, while the torque will be about 170 lb. ft. So it is plain to see that even should one have the two curves very little would be learned unless the requirements of the engine were understood.

KNIGHT ENGINE OPERATION

Q—Publish an illustration of a Hudson Super 6 and an Essex crankshaft.

2—What is the highest speed that can be obtained from a stock Buick 6, Essex, Hudson, Stanley Steamer, Packard and Overland 4 touring cars?

3—How much more speed and power will be given by installing Dunn counter-balances on a Ford touring car?

4—What is the length of the frame back of the driver's seat on a Ford 1-ton truck, and can a 10 ft. box be used with good results?

5—Is it necessary to remove the engine from a Ford truck to tighten the main and connecting rod bearings?

6—Explain the operation of a Willys-Knight engine and show how the valves work and why the carbon need not be removed.—Obe Law, Indianola, Iowa.

1—Illustration of the Hudson crankshaft was published in the Feb. 12 issue of MOTOR AGE. The Essex crankshaft illustration is unavailable, but it is balanced very similar to the Hudson crankshaft.

2—There is a great variation of speed due to factors which are different in every car. Probably the greatest factor that governs the absolute maximum speed that can be obtained is the personal factor, or in other words, the driver. All of the cars mentioned will

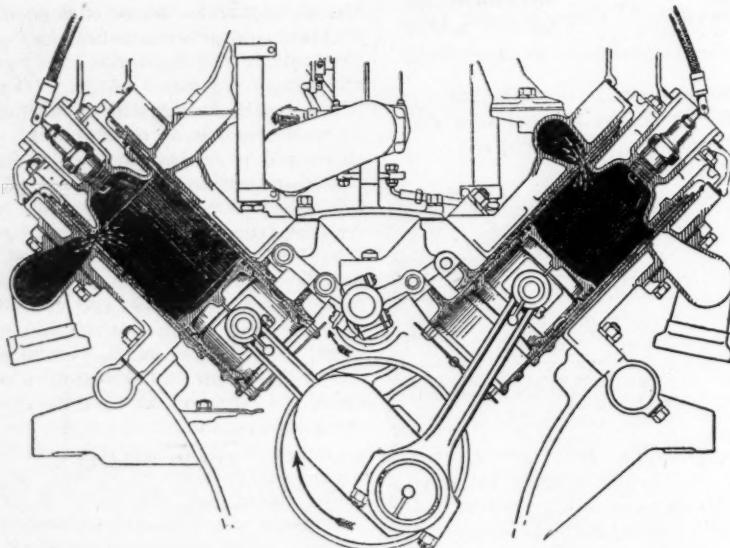


Fig. 3. Section view of the Willys-Knight 8-cylinder engine showing the exhaust stroke at the left end and the intake stroke at the right

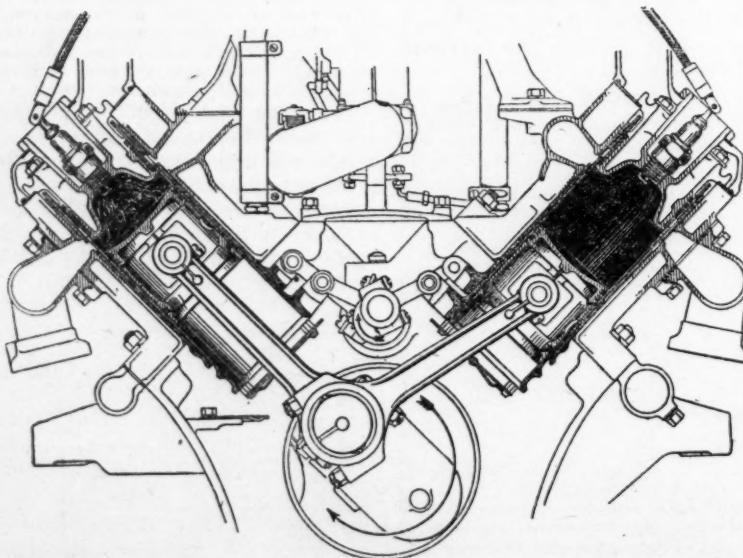


Fig. 4. Showing the explosion or power stroke at the left end and the compression stroke at the right

make at least 60 m.p.h. and some of them will probably make at least 75 m.p.h. under ideal conditions.

3—We are not in a position to state how much speed can be obtained by the use of these counterbalances. The balancing of an engine is quite a delicate operation and unless the installation is perfect there will be no advantage gained. Remember that just bolting weights on the crankshaft will not guarantee perfect balance. For instance, if a new crankshaft is thrown on the floor in a rough manner you may find that it is .003 or .004 out and you can easily see that with this condition the installation of counterbalances will do very little good. Every factor or balance must be taken into consideration in order to get a job that will eliminate vibration and allow the engine to be run at a higher speed. The balancing will not give greater power or speed, but will allow the engine a wider range of speed, which means the development of more power.

We do not know exactly how far the frame extends back of the seat, but it is approximately 5 ft. A 10 ft. box would extend at least 5 ft. beyond the rear axle and we do not believe that this would prove satisfactory.

5—It is possible to take up the connecting rod bearings without removing the engine from the car, but if the main bearings are to be adjusted the engine should be removed from the car.

6—For the purpose of explaining the action of the sleeves, we may consider the cycle of operation in a single cylinder which occurs in each of the eight cylinders in the following sequence: No. 1 cylinder, right hand block; No. 1 cylinder, left hand block; No. 3 cylinder, right hand block; No. 3 cylinder, left hand block; No. 4 cylinder, right hand block; No. 4 cylinder left hand block; No. 2 cylinder, right hand block; No. 2, left hand block. Refer to Figs. 3 and 4.

The right hand block is that on the right side when seated in the car.

When the piston is on top center after completion of the exhaust stroke, the intake port in the inner sleeve is in line with the intake port in the cylinder block as the piston starts downward. The two intake ports in the sleeve continue in register until the piston has reached and passed its lower center. At this instant the lower edge of the junk ring in the cylinder head and closes the intake opening. The inner sleeve continues its upward direction of travel through the compression or second stroke of the engine until the piston reached its top center or until it is at the top of its travel. At approximately this instant, determined by the position of the spark control lever above the steering wheel, the explosion occurs in the combustion chamber and the piston is driven downward by the force generated. At the same time, the inner sleeve starts to travel downward, and as the piston reaches the bottom of its travel the exhaust port in the inner sleeve and the exhaust port in the outer sleeve start to register with the openings on the cylinder block which leads to

the exhaust manifold. This opening continues unobstructed until the piston has completed its upward stroke and forces the exhaust or burned gas into the exhaust pipe.

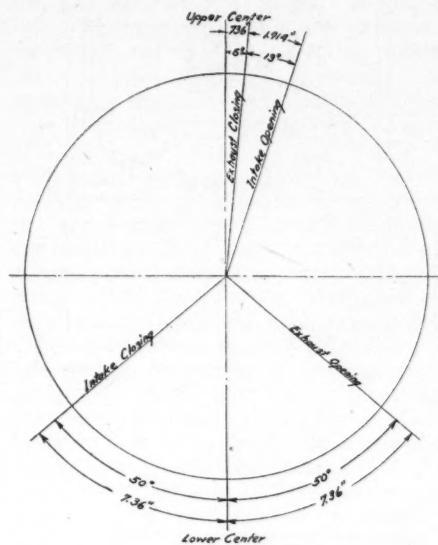


Fig. 5. Valve timing diagram of the Moline-Knight model M K 40, 1915-1916

From this explanation it is evident that the valve timing may be checked by determining the relative position of the piston and the ports in the sleeves and cylinder block. As the sleeves are all driven from a single eccentric shaft, there is no possibility of their relative position being changed. If the sleeves in one cylinder are properly set, all will operate satisfactorily.

The reason why the carbon has no ill effects and need not be removed is that the carbon tends to make the junk ring fit snugly as it should. In rare cases carbon collects to the extent that causes pre-ignition, but in no cases should the carbon be removed from around the junk ring.

TIMING MOLINE KNIGHT

Q—A Moline Knight model M K 40 leaks cylinder oil from the rear main bearing cap. The oil is forced by the pump through this cap to the hollow crank-shaft, where it is distributed to the bearings. Is the bearing packed to prevent this leakage of oil? If so, how must it be repacked?

2—Instruct how to time the sleeves of this car.—George B. Weller, Iowa City, Iowa.

1—This is probably a case of a loose rear main bearing. After passing through

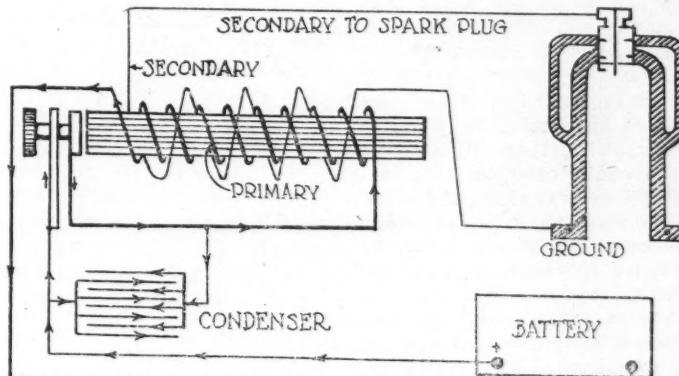


Fig. 6. Diagram of condenser showing the flow of current

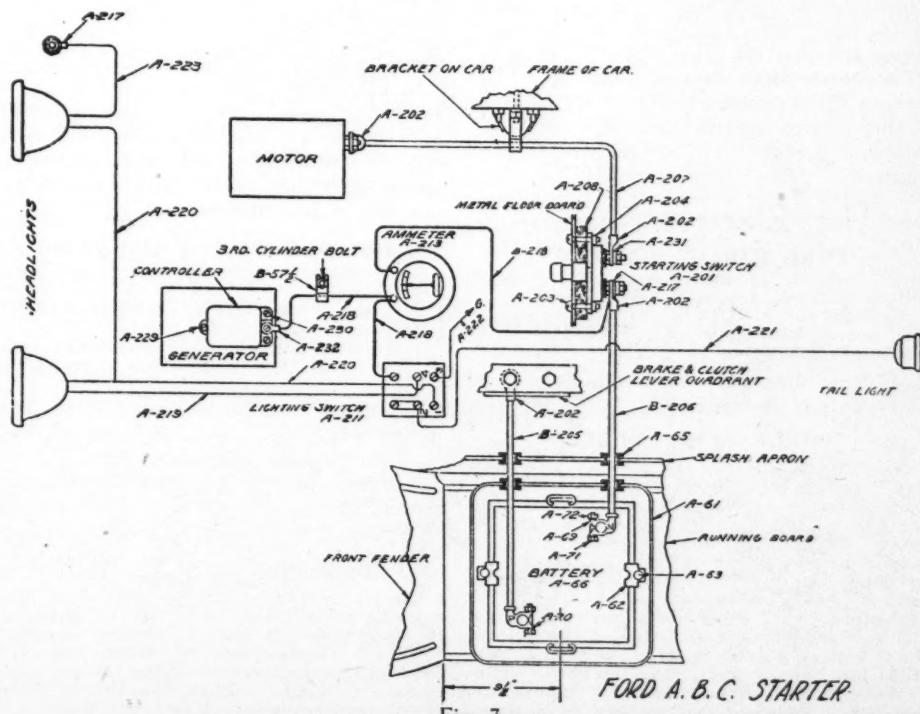


Fig. 7

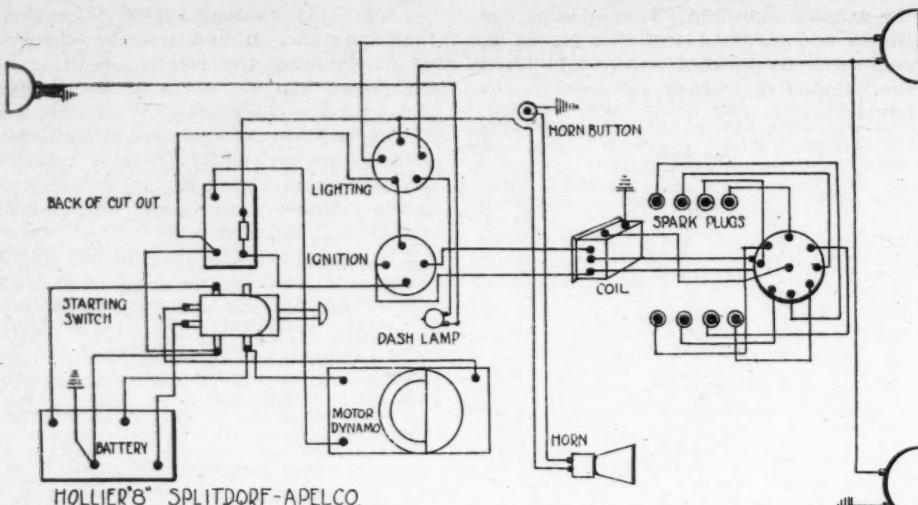


Fig. 8

the bearing the oil is supposed to drain back into the crank case. It is also possible that the passage through which this oil drains is clogged.

2—The timing diagram is shown in Fig. 5. To time the engine remove No. 2 spark plug and inspection plug in intake manifold. Drop small light into cylinder No. 2 through the spark plug hole and turn the engine over until port No. 2 starts to open as shown when a fine ray of light is observed when looking into the inspection hole. Care must be taken not to have more than a hair line of light showing through the port.

Remove the chain case covering and plate exposing eccentric shaft, chain and sprocket. Remove three cap screws from center of sprocket and turn flywheel until marking "open intake 2 and 3" comes to top center.

Examine the eccentric shaft sprocket center and see if any three holes match up with the sprocket. If unable to find three that line up, break chain by removing the connecting link. Advance sprocket one tooth at a time until three holes are found, being careful at the same time not to turn either crankshaft or eccentric shaft. Care should be taken not to break small link.

Put in cap screws and wire same in place. Replace chain covering and plate.

The Electric System

FORD WIRING DIAGRAM

Q—Publish wiring diagram of the Genolite lighting system for a Ford.

2—Also the A. B. C. Westinghouse starting and lighting system for Fords.—John G. Sillak, Medicine Hat, Alberta, Canada.

1—This diagram is unavailable.

2—This is shown in Fig. 7.

CONDENSER TROUBLE

Q—Since a Buick D 45 has recently been overhauled, it runs well for 5 or 6 miles and then begins to miss and at the end of 2 or 3 miles it will hardly go on low. Upon examination of the circuit breaker points they were found to be covered with a sort of greenish gray scale which was removed. Then the car ran all right for 5 or 6 miles and the same trouble occurred again. One of the points has been replaced with a new one but that did not remedy the trouble. The valves were ground and new rings installed in the top groove of the pistons.

The compression is good and the timing is correct and the car pulls fairly well. New spark plugs have been installed. The carburetor is all right. Is it possible that the fault is in the coil? The gap in the circuit breaker has been set according to the Delco gage furnished with the car. The spark plugs have also been gaged. The car has been driven about 11,000 miles.—Geo. Flanigan, Phillipsburg, Kas.

This is very likely due to a burned out condenser in the ignition coil. A defective condenser will cause excessive sparking at the breaker points and cause missing at low speeds.

HOLLIER WIRING DIAGRAM

Q—Publish wiring diagram of the 1914 Jeffery 4.

2—Publish diagram of generator internal circuits.

3—Publish wiring diagram of the 1915 Hollier 158.—A. C. Lindsay, Litchfield, Mich.

1-2—This diagram is the same as that published April 1. It also shows the internal circuits of generator.

3—Diagram of the Splitdorf Apelco system on the 1915 Hollier 158 is shown in Fig. 8.

OPERATION OF SPARK COIL

Q—On a Remy high tension coil and some other makes, the primary winding is separated from the secondary winding by heavy insulation, so how does the current in the primary ever get to the secondary to make enough current to jump the gap in the spark plug?

2—They say that when the primary wire is wound around the iron core it creates an electro magnet, how can it. the iron core is also insulated from the primary winding?

3—Publish a closeup view of a condenser. Show the direction of the current.

4—Show a sketch of a Remy coil with arrows in the direction the current flows.—Edgar Durman, Jr., San Francisco, Calif.

1—This is exactly the case. The high tension coil is really a transformer and the relation of the primary to secondary voltage is practically the relation between the number of turns of wire on each. When an alternating current is applied to the primary of a coil of this type it creates a magnetic field which induces current in the secondary winding. When applied to the ignition system of the automobile engine a type of interrupter is used to get the desired transformer action.

2—This statement is absolutely true. If you apply direct current to any coil

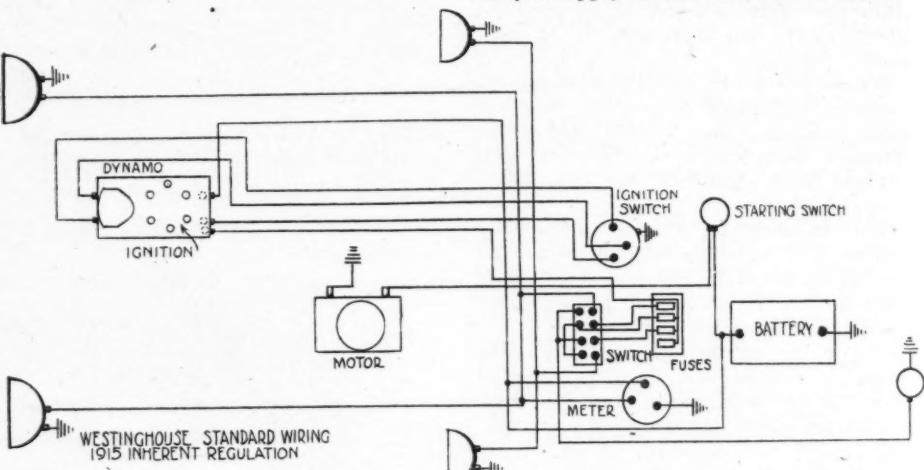


Fig. 9

of wire and insert a core you have a magnetic field that will magnetize that core. If you have not made a study of the very ground fundamentals of electricity it will be very hard to appreciate many of the actions of it.

3—The condenser is shown in Fig. 6. The condenser is connected across the breaker points in parallel with the secondary or high winding. Complete details of its function in the ignition circuit were given in the April 8 issue of MOTOR AGE.

4—A diagram showing the principle of high-tension ignition is given in Fig. 6. The action and direction of flow of the current in the Remy coil is the same as shown.

WIRING ON MARION

Q—Publish diagram of the Westinghouse starting, ignition and lighting circuit as used on the 1915 Marion.—R. J. Spurgeon, North Side Garage, LaHarpe, Ill.

The Westinghouse system used on the 1915 Marion is shown in Fig. 9.

INSTALLING MAGNETO

Q—Seem to be having quite a bit of ignition trouble with a Hudson 6-54 1913. Would you recommend a Bosch high tension magneto? Could this be installed by myself? Give the number and model most suited for this car.

2—Should the generator be removed or

can it still be used for charging the battery and starting engine?

3—Should an ammeter be installed?—Theodore Jorgensen, Gunn, Wyo.

1—We are not in a position to recommend any particular make of magneto but if you desire to install Bosch we are sure it would prove very satisfactory. If you are somewhat of a mechanic you can probably make the installation yourself. The Bosch company has standard attachment for practically every car on the market and full details can be obtained by writing to them.

2—It is not necessary to remove the generator and we believe that it should be left on for charging the battery.

3—An ammeter is very desirable to determine the rate of charge and discharge and should be installed.

Rebuilding

FORD REBUILDING

Q—Desire to rebuild a Ford for speed. The engine is being reboored and desire to use light pistons but have heard that aluminum pistons would not wear well in a short stroke engine. Would aluminum connecting rods with gray iron pistons and counterbalanced crank-shaft work together or not?

2—How much should the valve ports be to get best results?

3—Would it be best to have the manifold openings bored larger and a different intake manifold of larger size used and how much?

4—Expect to use 3 to 1 gears in the rear system. Would new departure ball bearings give better results than the stock roller bearings used in Ford cars? If so what size would it take and could they be used on the outer ends of the axle shafts and roller bearings next to differential with good results? Also desire to use them for driveshaft and what size would it take for this? Expect to use the double row. Could they be obtained to fit in the Ford sleeves and over

from the Craig Hunt, Indianapolis, Ind., Laurel Motors Corporation, Anderson, Ind., Trindl Co., 2917-21 S. Wabash Ave., Chicago. Craig Hunt can also furnish all the necessary parts for undershing and also special bodies. If you do not wish to go to this much expense a very fast car can be built by making some of the following changes. Use aluminum pistons and light connecting rods. Increase the size of the valve ports $3/16$ in. The valve springs should be stiffened, either by installing heavier springs or by placing spacers between the upper ends of springs and the cylinder casting. It is very desirable to use a high speed camshaft. Some men who have rebuilt Fords claim that good results can be obtained using a camshaft taken from Fords of 1912 or earlier. If the regular camshaft is used good results will not be obtained by advancing the timing one tooth of the timing gears. Make a test to be sure that the crankshaft is in perfect alignment. If possible install a force feed lubrication system. Use a high tension magneto or battery ignition system and purchase a carburetor for high speed work. A description of a rebuilt Ford that attained a speed of 70 m.p.h. was given in the April 8 issue of MOTOR AGE.

3—in determining the kind and size of manifold it would be well to look over some of the patented manifolds. The Craig Hunt and the Laurel Motors Corp. have cars which have been used in dirt track races and you can undoubtedly get the full details of these cars by writing to these companies.

4—in the rebuilding of the car mentioned in question 1, the roller bearings on the outer end of each axle were taken

out and a sleeve which projects into the hub was inserted. The roller bearing just ahead of the pinion was replaced by two New Departure double row ball bearings. The end thrust bearings in the rear axle were replaced with ball thrust bearings.

BUICK BODY DESIGN

Q—Publish design of body for a Buick E-45 that would be a snappy, deep-bodied, low-swung, 4-passenger inclosed type.

2—What is necessary to speed this car up? What speed should it make thus equipped? What would be the probable cost? It will make 60 m.p.h. easily now.—Milford R. Sims, Taunemin, Ill.

1—See Fig 11.

2—About the only way to speed this car up is to change the gear ratio and this will mean a sacrifice of power. It is to be remembered that a closed body will give added weight and increase the wind resistance. We believe that the car is fast enough as it is and we know of 1920 Buick coupes that have made as high as 65 m.p.h. So far as we know there are very few places where a speed of 65 m.p.h. or better can be maintained and then it must be done in violation of the law.

REBUILDING LOZIER 84

Q—Publish sketch of racy roadster or raceabout for a Lozier 84.

2—What year did they use engine number M2419?

3—in a recent issue you give a gear ratio as 3.93 to 1 speed 55 m.p.h. What ratio will give a speed of 75 m.p.h.? What size gears and where can they be secured? —Chas. Hayes, Richmond, Va.

1—See Fig 10.

2—the Lozier is no longer in production and it is practically impossible to trace the engine numbers to determine the time at which they were built.

3—in order to get 75 miles per hour out of this car it will be necessary to use a gear ratio of about $2\frac{1}{2}$ to 1. Parts can be obtained from the Lozier Motor Car Co., Fort and Sixth Sts., Detroit.

LOWERING FRAME

Q—in what manner could the frame on a 1913 Buick 31 be lowered without extensive alterations, at the same time leaving enough road clearance?—R. J. McDowell, Cedar Rapids, Iowa.

This car frame cannot be lowered without extensive alterations. Because of the spring construction it is not a simple matter to drop the frame as with the Ford construction where a transversal type of spring is used,

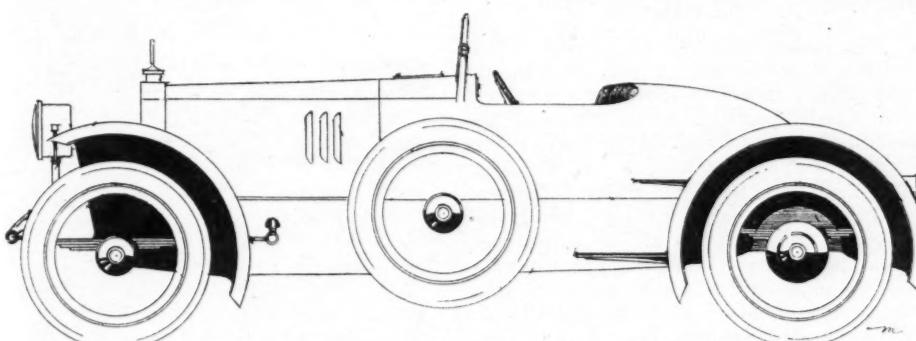


Fig. 10. Showing roadster body for the Lozier 84

the axle shaft without much labor? Will use ball thrust bearings.—Harry L. Varum, Springfield, Ky.

1—Aluminum pistons have been used in rebuilding jobs of this kind and have proven very satisfactory. However it is not necessary to use lighter pistons and connecting rods to get high speed. We believe that you will be willing to spend a moderate sum to get the car in shape for high speed work and will make our suggestions on that basis. The use of a 16 valve head with a special carburetor and ignition system has enabled some rebuilt cars of this make to attain a speed of about 80 m.p.h. The frame should be lowered and 3 to 1 gears used. The 16 valve head can be secured

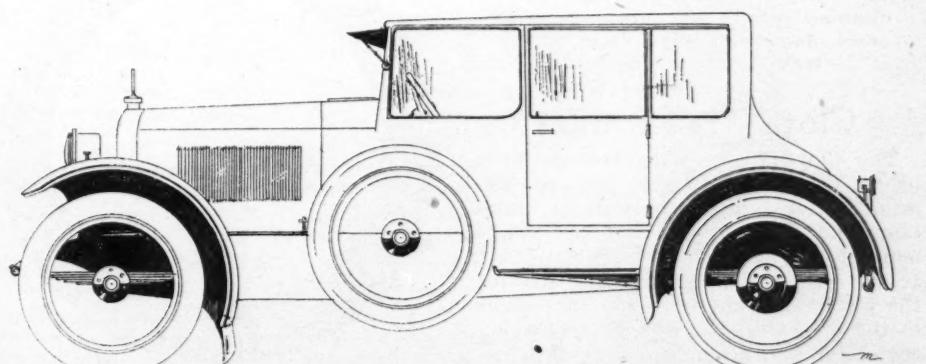
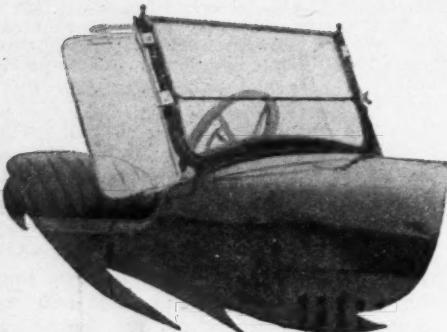


Fig. 11. Sketch of body for a Buick E-45 4-passenger inclosed type

The Accessory Show Case

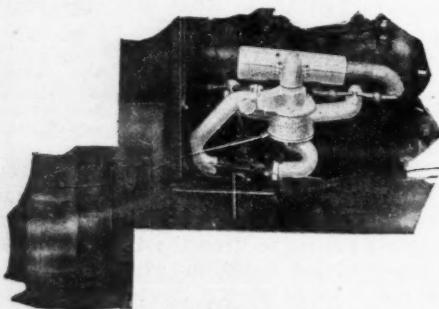
New Fitments for the Car



The D-Flekt-O side shields can be adjusted to any angle and add to the good appearance of the car

D-Flekt-O Side Shields

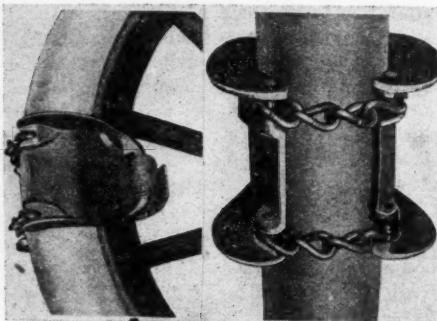
The principle on which the D-Flekt-O side shield is constructed is plainly shown in the illustration. It has a strong nickel rod with a clamp fitted over the edges of the light above and below. This bracket rod runs around the edge of the glass next to the windshield post, to which it is fastened securely by two patented brackets, at a considerable distance apart. The position of the glass in the bracket can be adjusted by a thumb nut and the bracket which fastens to the windshield may be tilted at any angle. It is double tiltable and does not interfere with spotlight, curtain or mirror. It is a product of the Schonberg Mfg. Co., Fargo, N. D.



The Cloyd transformer acts as a cleaning device for the incoming gases and takes the place of the regular intake manifold

Cloyd Transformer

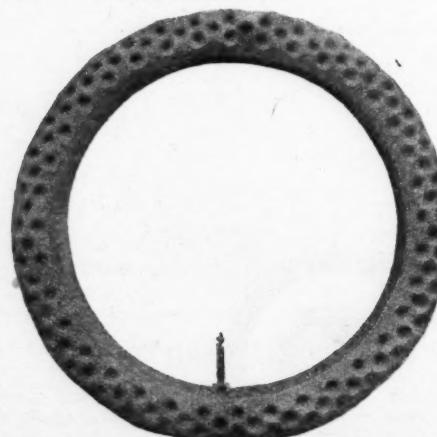
The Cloyd transformer manufactured by the Cloyd Mfg. Co., 103 Main St., Peoria, Ill., is built entirely from aluminum and displaces the cast-iron intake manifold as shown in the illustration. It not only provides a passage way for the charge to pass from the carburetor to the cylinders, but acts as a cleaning device for the incoming charge as it removes the residue found in the gasoline and deposits it in a tank. Price, \$25.



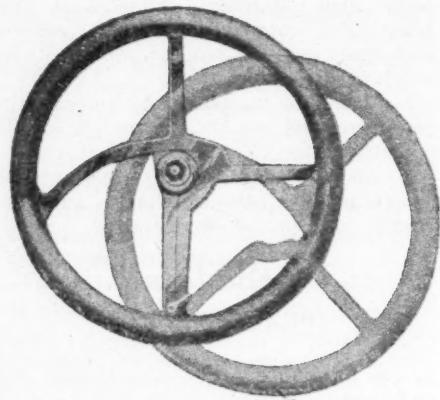
Chamberlain mud hook has chains across the tread of the tire and the sections connecting the chains provide traction in deep mud

Climax Compression Inner Tube

The inner tube shown in the illustration is something entirely new in the tire line. It is so molded that about 700 small pockets, more or less, depending upon the size of the tube, hemispherical in shape and about $\frac{3}{4}$ -in. in depth. When the tube is inserted in the casing it fits snugly before being inflated. Then as the air is introduced these pockets are pushed out against the casing causing a compression in the walls of the tube. Made by the Climax Rubber Co., Columbus, O.



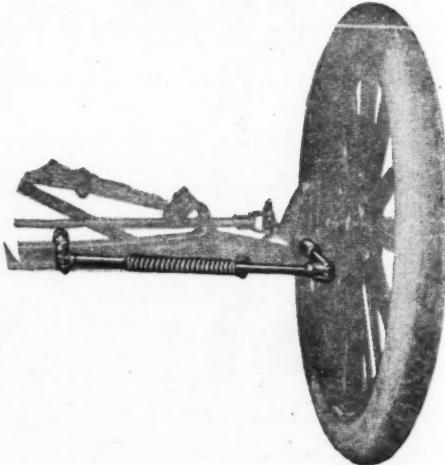
The Climax inner tube is built upon an novel idea



Stout's adjustable steering wheel is built to swing out of the way when entering or leaving the car

Adjustable Steering Wheel

The Stout's adjustable steering wheel shown will swing out of your way, give you absolute freedom entering or leaving the seat of your car. It is simple and plain and is placed on the market at a reasonable price by Stout's Mfg. Co., Inc., 62 Market, Lockport, N. Y.



Protecto is attached to the steering knuckle and the Ford axle and will not allow the front wheels to "jack-knife"

Protecto

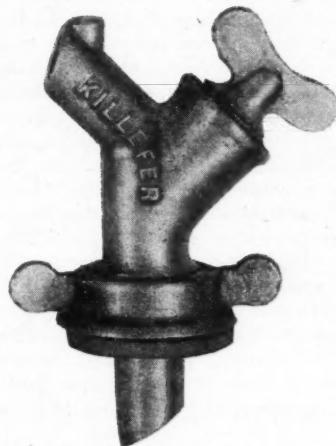
This device is attached to the Ford axle and steering knuckle as shown is the product of the Robinson Motor Truck Co., 908 Hennepin Ave., Minneapolis. It is claimed that it protects in the emergency when the steering assembly gets out of order, and controls the front wheels so that they will not "jack knife." It is also claimed that strains to the arms of the driver from road shock and jerking of the steering gear from running on rough roads are eliminated. It lists at \$15.

Service Equipment

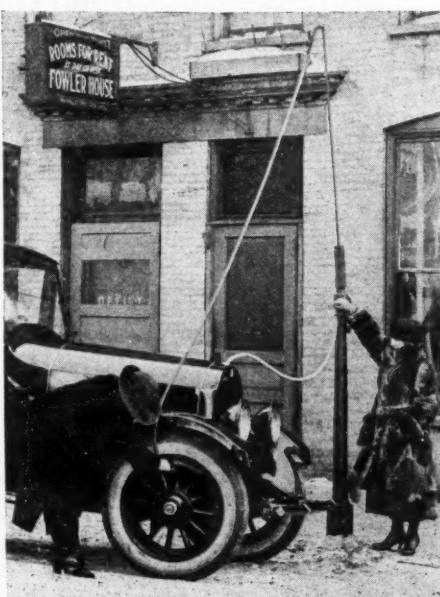
Time Savers for the Shop

Assembling and Welding Table

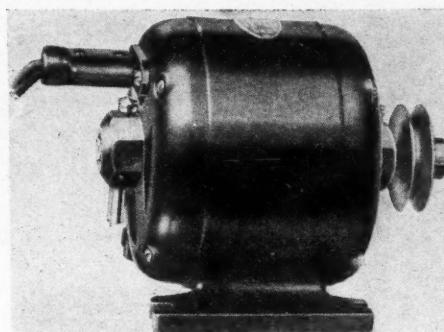
The Continental assembling and welding table was designed to bring the work to the man instead of the man going to the work. On ordinary assembly, layout, jig and die work welding, painting, and all kinds of bench work, it will be found extremely valuable. The table is heavy enough to stand rough treatment and is finished so it may be used as a base plate and layout table. It is manufactured by the Continental Shop Equipment Co., Columbus, Ind.



Killefer solderless faucet has a novel method of attaching to the can without the use of solder



This air hose has an exceptionally long reach and can be attached to the tire valve by reaching over the car instead of being carried around the end of it



The Ellington general utility motor can be moved about readily and operates from the lighting circuit

Ellington Motor

A general utility motor than can be moved about and operates from the lighting circuit is a very valuable device for any service station. The Ellington motor shown is built in five sizes, 1-12, 1-8, 1-6, 1-4 and 1-3 h. p., in all standard frequencies, voltage and speeds. The motor is manufactured by the Ellington Electric Co., Quincy, Ill.

Double Service Air Hose Stand

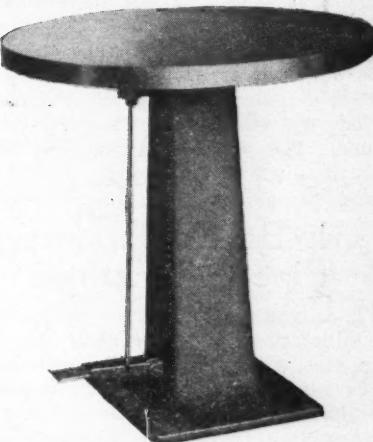
The air hose stand shown has an exceptionally long reach, being the length of the hose plus the length of the pipe which is about 15 or 16 ft. The column is cast iron with a large door at the bottom for attaching the hose to the service pipe, and provision for water connection and sign at the top. The spring which is wound to maintain a constant tension is fitted to a sleeve which in turn fits on the top of the column and if necessary can be easily removed. The device is manufactured by Devices Industry, Oshkosh, Wis.

Killefer Solderless Faucet

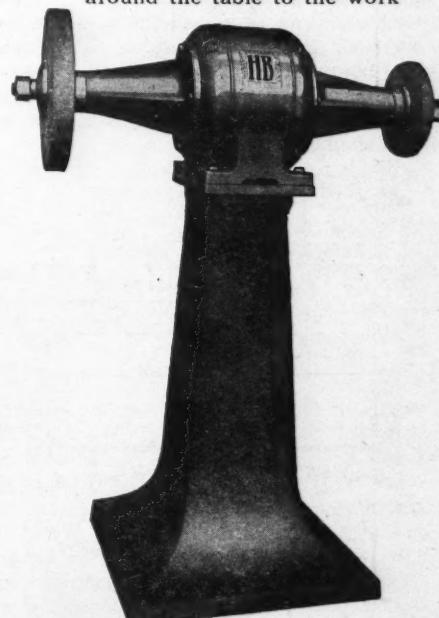
The faucet shown is like any ordinary faucet except the method of entering and attaching to the can which is patented. The point of the faucet is ground off in a bevel and acts as a tool which cuts through thin sheet metal very readily. The screw end of the flange is pointed so as to screw into the can. Two turns, screw this flange inside the can so that when the wing nut is turned against the rubber gasket a tight joint is made for oil, gasoline, water, etc. This faucet is distributed by H. R. Francis, 2834 Stephenson Ave., Los Angeles.

The H. B. Ball Bearing Motor Grinder

A new time and labor saving machine for service station is the H. B. ball bearing motor grinder, manufactured by Hobart Bros. Co., Troy, here illustrated. It is equipped with a 2 hp. ball bearing electric motor and has ample power for the grinding of castings, sharpening of tools, tire buffing, and many other uses around a service station. Buffing wheel or wire brush wheel can be substituted for one of the grinder wheels. It has a rather heavy base to insure freedom from vibration. The total weight of the machine is 275 lbs.



Continental assembling table is designed to bring the work to the man, instead of the man having to go around the table to the work



The H. B. ball bearing motor grinder for grinding, sharpening tools, tire buffing and general utility service

The Automotive Repair Shop

Practical Maintenance Hints

Simple Drawer Stop for Bench Drawers

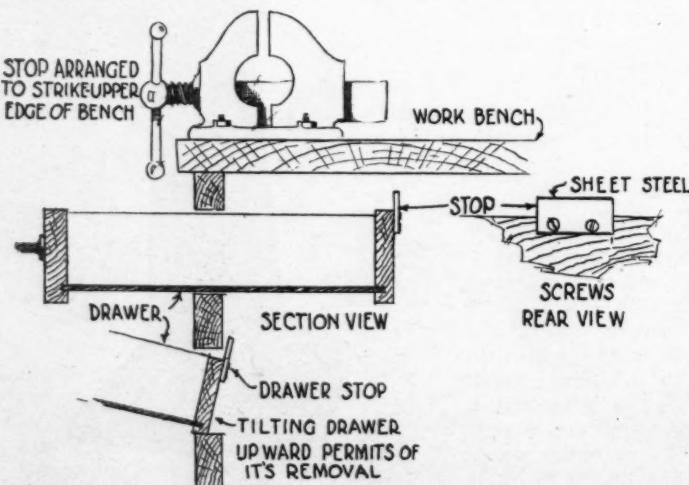
Bench drawers when pulled out too far drop on the floor and spill their contents all over the place. While care may be used by the owner some one else will thoughtlessly pull them out too far and fifteen minutes or more is spent in collecting the contents from under the bench and out of crevices.

To overcome the dropping of the drawer when opened too far, a simple stop is shown in the illustration. This stop consists of a piece of sheet metal about three inches square, and secured to the back edge of the drawer by two or more screws. When the drawer is pulled out this strikes the upper edge of the drawer opening and holds it. This device does not prevent taking the drawer out, for by tilting the outer edge up the drawer can be removed or replaced. The plate is put on, of course, with the drawer removed.

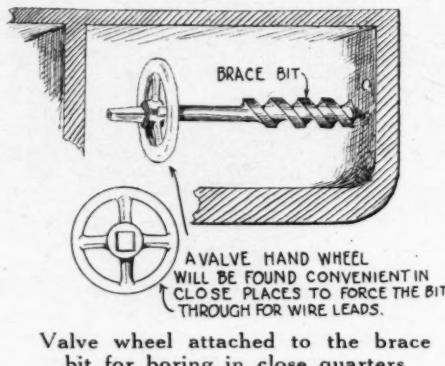
Work Bench Supports of Pipe and Fittings

The advantage of the construction in the illustration is in the rigid base that iron pipe will give a work bench which in the event it should loosen the parts are simply put into the vise and screwed up until they are tight. Wooden bench supports will become loose, due to work done on the bench and the seasoning, or drying out of the wood.

The construction is simple, only pipe fitting tools are used and the size can be varied for the uses to which the bench is to be put. It is comparatively easy to keep the space under this type of bench swept clean and the fire risk is diminished.



Stop attached to back of drawer to prevent its being pulled out entirely and spilling contents



Valve wheel attached to the brace bit for boring in close quarters

Valve Wheel for Boring in Close Places

In wiring automobiles for parking lights, dome lamps and other special wiring jobs, the ordinary bit brace will be found too large to use for drilling cable holes.

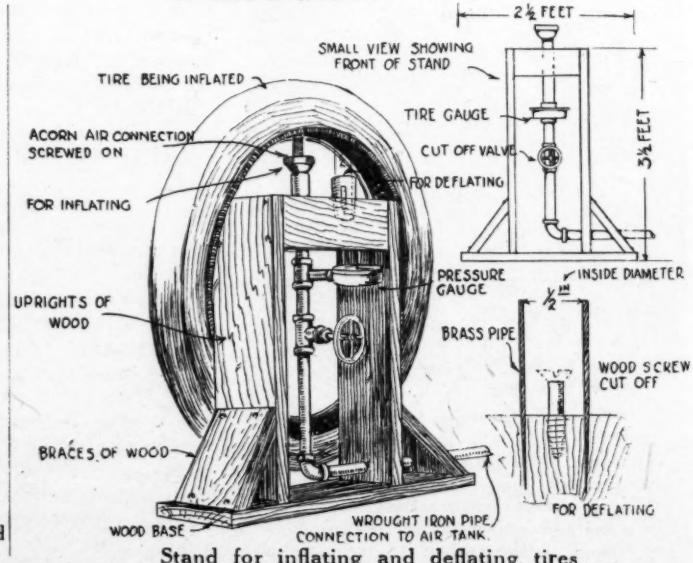
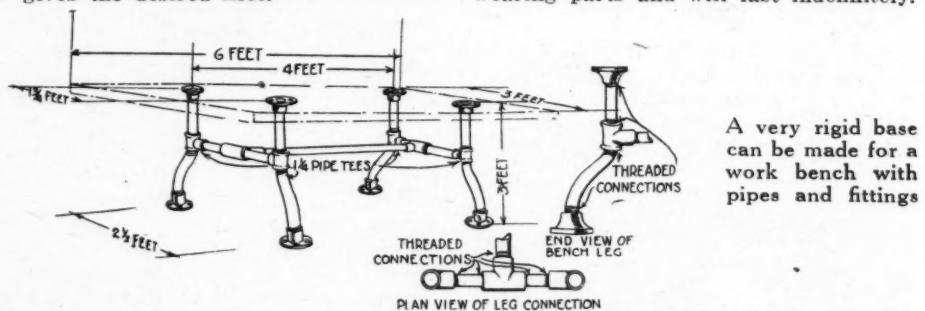
A method that has been found useful in these instances is to take a valve handwheel as is used on water and steam valves, place this over the stem of the bit and rotate it with the hand. While the method is somewhat slow it gives the desired hole.

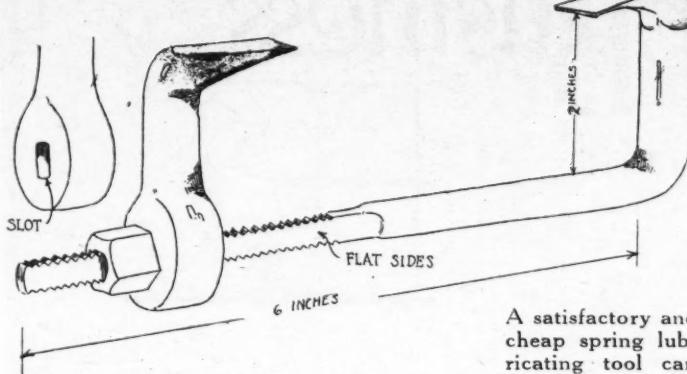
Stand for Inflating and Deflating Tires

The stand shown in the illustration has several features of advantage in the tire repair shop. No flexible hose is used with the faults of wastage of air through leakage and frequently in need of repair and renewal. This stand consists of a wooden support with a pipe lead through it for the air. An acorn coupling is screwed to the top of the pipe, a tire or pressure gage is fastened in the pipe line below this and a cutoff valve beneath this.

In use the tire to be inflated is set on the acorn coupling and by closing the valve below the air pressure is read immediately. Too high pressure is reduced by shifting the tire to the deflating attachment in front of the air pipe. This feature consists of a wood screw set in the stand with the head cut off, leaving a quarter inch projecting. A piece of brass tube is driven into the stand to encircle the screw stud. This tube should be about one-half inch inside to place the valve stem centrally over the protruding stud.

Apart from the saving of considerable time in inflating, testing and deflating, a fixture of this type has practically no wearing parts and will last indefinitely.





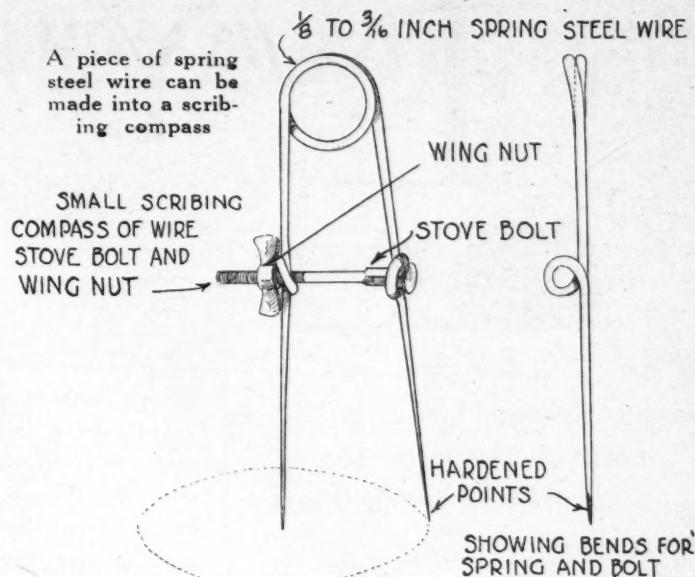
Spring Lubricating Tools

To spread apart the spring leafs of the automobile and truck for the purpose of inserting lubricant, one must use a wedge or thin chisel unless fortunate enough to possess a patented spring leaf spreader. A very satisfactory and cheap substitute that makes the work easy to do, can be made at home from round steel bar, a truss or brace rod of steel. First draw one end of the stock out thin to a wedge shape and then bend it over at right angles; about 2 in. from this bend, make another. Next the end is threaded standard $\frac{3}{4}$ size to take a nut for 3 in., and the sides flattened by filing, as indicated. A cross head or sliding wedge piece is then made, and this put on the tool. By setting up the nut it draws the two edges together between the leaves of the spring, forcing them apart so that grease or graphite can be spread between them with a case knife.

Small Scribing Compass of Wire

A piece of steel spring wire when bent as shown in the illustration makes a serviceable and inexpensive scribing compass that the mechanic will find useful for laying out holes, marking dimensions, etc. An ordinary stove bolt and a wing nut is the means of setting the points the desired distance apart. The points of the tool should be hardened by heating red and plunging them in oil. The spring wire used can be one-eighth to three-sixteenths of an inch in diameter, using the heavier wire where a compass is to be made.

A satisfactory and cheap spring lubricating tool can be made in the shop from the above sketch



ing the task of the mechanic an easier one. The fixture is suitable for the office, shop, washrack or paint shop. The construction is simple, wood and tin are the materials used.

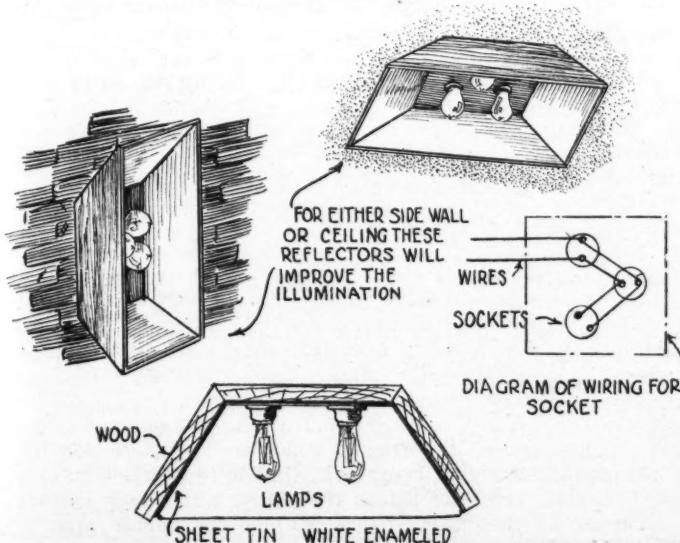
With a saw, hammer and pair of tin snips these fixtures can be made up in a short while. The interior surface is white enameled and the fixture nailed or screwed into place.

Improving the Illumination of the Garage

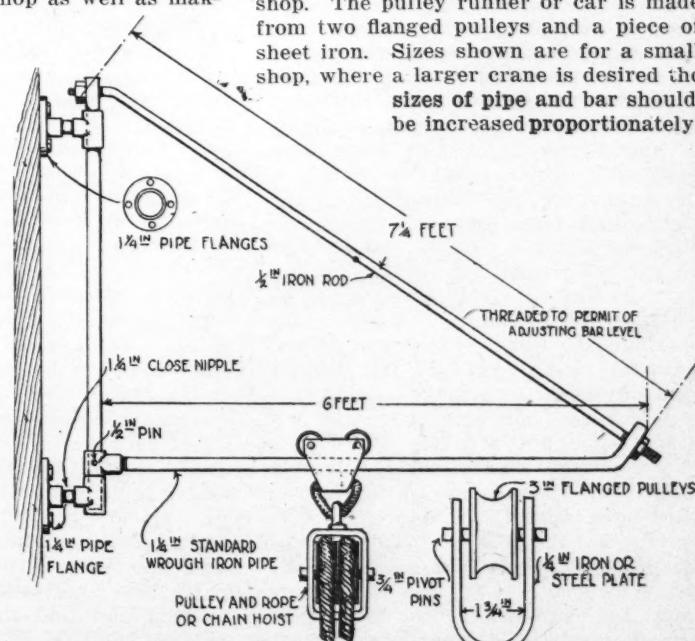
The illumination of the garage or shop is a detail of very little attention in many instances, however from the standpoint of workmanship and appearance this detail is one worth improving.

The usual method is to mount the lamp bulbs on the side wall or ceiling and hope that the garage will be lighted, if not, a few more sockets are added. Lights mounted on a dark ceiling or wall neither give good light or look very impressive and it is always advisable to add some sort of a reflector which not only improves the lighting but the impressions as well.

In the illustration a simple form of reflector is shown that adds to the attractiveness of the shop as well as making



It is well worth while in improved work the men will turn out to see that your shop is well lighted



Wall crane made from pipes and fittings

Law in Your Business

By Wellington Gustin



Garage Keepers Liable for Loss of Property Delivered to Wrong Party

A new method of stealing to the loss of the garage owner is brought out in an action of a garage owner in New York City to recover against a truck owner for supplies and car storage.

One evening, when the truck was brought into the garage by the owner's chauffeur, there were upon it five flasks of quicksilver of the value of \$500. For the greater safety of the mineral, the chauffeur placed it, with the garage owner's consent, in the private office, notifying the custodian of the garage that he would take the truck out at 5:30 the next morning. On the following morning before 5:30 an unidentified man called at the garage for the truck, and also for the quicksilver, which he knew, somehow, to be in the office, and the custodian at that time, who was not the custodian in charge the night before helped the man put the quicksilver on the truck, and assisted him in driving the truck out of the garage.

It appears there was no representation made in any form by the thief, for such he was conceded to be, that he was connected with, or came on behalf of the truck owner; nor was any evidence of authority to take away the truck and quicksilver asked for by the man in charge of the garage. The thief abandoned the truck at some little distance from the garage, after removing the quicksilver, which has never been recovered. (Rubin et al. vs. Forwarders' Auto Trucking Corp.) Later, the truck owner refused to pay the garage owner his bill for supplies and storage, and the garageman brought suit to collect. Against this action the truck owner set up a counter claim for \$500 covering the loss of the quicksilver. The trial court dismissed the counter claim for the loss upon the ground that the placing of the quicksilver in the garage office put the risk of its loss upon the truck owner, there being no charges for keeping the quicksilver.

But upon appeal, the Supreme Court of New York city reversed this decision and directed judgment against the garage owner for \$500 less the latter's claim and storage. This court held that these facts showed the garage owner did not exercise sufficient care

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted him.

to protect the property of their customer. Regarding the service of storing the quicksilver as a mere gratuity, the court said that in view of the garageman's business, he did not take adequate measures to guard against the very sort of thing that occurred here, and occasioned the loss to the truck owner.

Negligent Driver of Automobile Must Pay for Injuries to His Guest

That one riding in an automobile as a guest, who is not guilty of contributing negligence, can recover against the driver for injury caused by driver's negligence is brought out in a recent New York case. And if this proposition of law was more thoroughly understood and appreciated, and there resulted more prosecution of claims for injuries under it, there would be a lessening of automobile accidents due to careless driving of motor cars.

In the case in question the plaintiff brought suit against the defendant who was owner of the car and operating it at the time of the accident, for negligence in such operation causing the injuries complained of. Plaintiff had invited the defendant to join his party in a deer hunt. Defendant in turn invited the party to go in his car. The accident occurred on the way to the hunt.

On the trial it was found that the driver was negligent and caused the accident and that the occupant of the car was not guilty of contributing to the accident. With nothing more a re-

covery could be had against the reckless driver. But the driver contended that the parties were engaged in a joint enterprise, and if so that the negligence of the driver is imputable to the other occupant or occupants of the car so engaged.

The case is unique in that here one person, concededly engaged in a common enterprise, has sought to maintain an action against one of his associates. The fact whether there is a joint enterprise is one of importance when the action is brought against a third person, said the court, but, as between themselves, there is no rule of law that throws a mantle of protection over the wrongful acts of an associate in a joint enterprise or in a partnership.

The court asks:

"Suppose one person assaults his co-partner; is the wrongdoer immune from liability because they were engaged at the time of the assault in the partnership business?"

"Suppose that, while engaged in the partnership business, one partner conducts himself so carelessly as, except for such partnership relations, would give a right of action, is the wrongdoer not liable to the injured partner? True, they are in a sense each acting as agent for the other; but does not an agent owe the duty of care towards his principal, and a principal towards his agent?" These questions answer themselves. A joint enterprise or partnership, says the court, is not for the purpose of permitting one of the parties thereto to commit a wrong upon his associates.

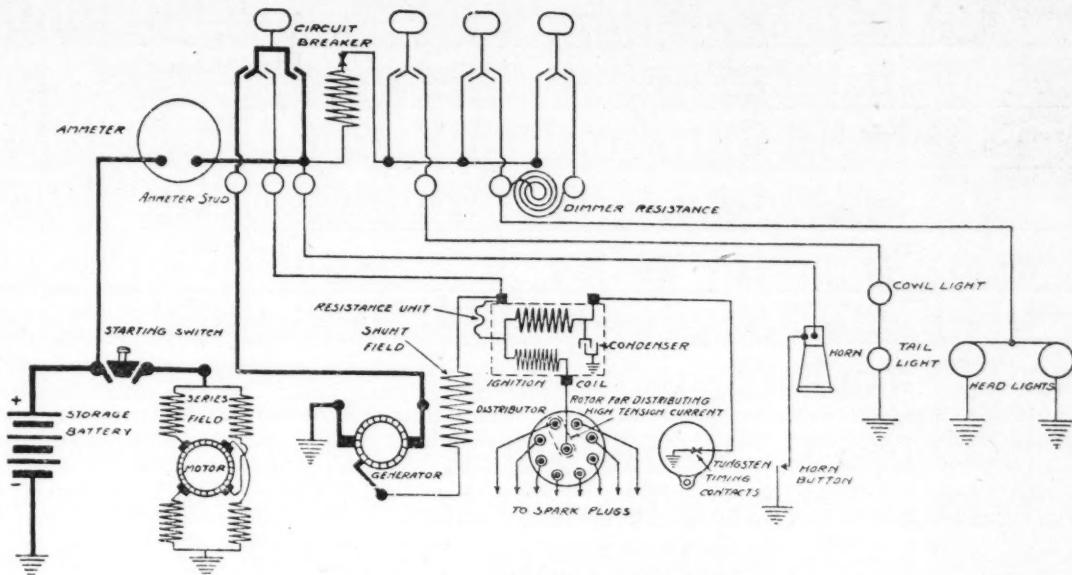
NECESSARY TO BRING SUIT

I have about \$700 coming in commissions for a firm in Pittsburgh and they will not pay me. The last time I went after this they refused to talk about it. What would you advise me to do? This is commission on selling trucks.—J. J. Ward, Akron, O.

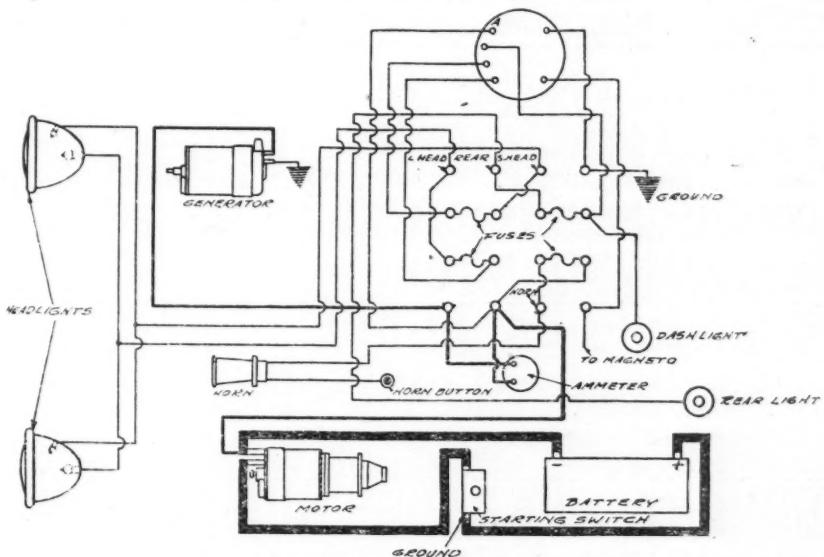
From your letter there is nothing to do but to bring suit and have a court to enforce your claim against your debtor. Some people refuse to pay an alleged debt, although they have no defense, while some have justifiable reasons when brought into court.

In any event, you seem to be put where there is no course left open to you but to bring suit, thereby putting your case up before the court, which may enforce your claim against the debtor after it has tried the case and decided in your favor.

Motor Age Weekly Wiring Chart No. 81



Cole 8—1915 and 1916 Model 850



1919 Jordan—Bijur System

Cole 8
1915 and 1916 Model 850

1919 Jordan Bijur System

Name of car and date on which wiring diagrams have appeared in previous issues

Allen—Dec. 18, '19
Auburn—Nov. 27, '19; April 1, '20
Briscoe—May 6, '20
Cadillac—April 22, '20
Chalmers—Nov. 27, '19
Chandler—May 20, '20
Crow-Elkhart—April 22, '20
Cutting—Nov. 6, '19
Daniels—Dec. 4, '19
Davis—Dec. 4, '19
Dixie—April 1, '20
Dodge—April 15, '20
Dorris—Dec. 11, '19

Dort—March 25, '20
Eclair—May 6, '20
Franklin—Dec. 11, '19; June 3, '20
General Battery Charging—Sept. 15, '19
General Magneto Diagram—June 5, '19
Grant—April 29, '20
Hupmobile—May 27, '20
Internal Connections—July 10-17-24, '19
Jeffery—May 13, '20
Keeton—Nov. 6, '19
King—May 20, '20
Kissel—May 27, '20
Lexington—Jan. 1, '20
Liberty—Jan. 1, '20
Locomobile—June 6, '20
Marmon—Dec. 25, '19; Jan. 22, '20
Mercer—Nov. 27, '19; March 25, '20
Mitchell—Jan. 8, '20
Moline-Knight—May 20, '20
Moon—Jan. 29, '20; March 11, '20
Moore—March 4, '20
Nash—March 11, '20
National—Feb. 12, '20
Oakland—April 15, '20

Oldsmobile—April 8, '20
Olympian—Jan. 22, '20
Packard—March 18, '20
Paige—July 3, '19; April 29, '20
Peerless—May 13, '20
Pierce-Arrow—Feb. 5, '20
Pierceless—May 13, '20
Pierce-Arrow—Feb. 5, '20
Pilot—March 4, '20
Premier—Dec. 18, '19; Feb. 26, '20
Reo—Nov. 13, '19
Roamer—March 18, '20
Saxon—April 8, '20
Scripps-Booth—Jan. 15, '20
Stearns-Knight—Jan. 8, '20
Stephens—Feb. 12, '20
Studebaker—Dec. 25, '19
Stutz—Feb. 5, '20
Templar—Jan. 29, '20
Velle—Feb. 19, '20
Westcott—Jan. 15, '20
White—Feb. 19, '20
Willys-Knight—Feb. 26, '20
Special Systems for Fords—May 15-22, '19

Motor Age Monthly Guide to Truck Specifications

These tables are revised and brought up to date monthly.

These tables are revised and enlarged.

Motor Age Monthly Guide									
These tables are revised and brought up to date monthly									
Name and Model	Name of Engine	No. of Cyl.	Tons Capacity	Chassis Price	Front Tires	Rear Tires	No. of Stroke	Axe	Steering Gear
A & B 3T.	4-5 1744	Bosch	none	1 2,775	38x7	Hink.	West.	Axe	Final Drive
A & B 5T.	5 4832 1d	Bosch	none	1 4,250	38x8	36x8	4-3 1/2x3	in-g.	Gearset
Acason R.	5 \$2,400	4832 1d	Own	2 1,450	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Acason RB.	1 2,650	36x52	Wauk.	1 1,150	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Acason L.	1 3,4900	36x52	Wauk.	1 1,850	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Acason M.	1 5,880	38x52	Wauk.	1 2,600	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Acason Tractor.	6 3,684	36x52	Wauk.	1 2,450	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Acason Tractor.	10 3,4434	34x52	Wauk.	1 2,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Ace.	3 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
All-American.	1 2,1575	34x3	Wauk.	1 1,050	34x3	34x5	4-3 1/2x3	in-g.	Gearset
All-American.	1 2,1575	34x3	Wauk.	1 1,050	34x3	34x5	4-3 1/2x3	in-g.	Gearset
All-American.	1 2,1575	34x3	Wauk.	1 1,050	34x3	34x5	4-3 1/2x3	in-g.	Gearset
All-Power C.	1 3,050	38x4	Wauk.	1 2,000	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Apex C.	1 1,495	36x52	Wauk.	1 1,050	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Apex D.	1 1,695	32x3	Wauk.	1 1,050	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Apex E.	2 2,450	36x4	Wauk.	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Armlader HW.	1 3,064	36x4	Wauk.	1 2,000	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Armlader HW.	1 3,064	36x4	Wauk.	1 2,000	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Atco IG.10	1 36x4	Buds	none	1 1,300	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Atlas.	3 3,775	38x4	Wauk.	1 2,400	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Attbury 7T.X.	3 4,775	30x5	40x60	1 2,400	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Attbury 7T.S.	5 5,575	30x5	40x60	1 2,400	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Autocar UG21.	2 2,400	34x4	34x5	1 2,400	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Available H-1.	1 2,250	36x52	36x8	1 2,250	36x4	36x8	4-3 1/2x3	in-g.	Gearset
Available H-2.	1 2,400	36x52	40x54	1 2,400	36x4	40x54	4-3 1/2x3	in-g.	Gearset
Available H-3.	1 2,400	36x52	40x54	1 2,400	36x4	40x54	4-3 1/2x3	in-g.	Gearset
Available H-5.	7 6,000	36x6	40x14	1 2,400	36x4	40x14	4-3 1/2x3	in-g.	Gearset
Beck D.	2 3,700	36x5	36x5d	1 2,400	36x4	36x5d	4-3 1/2x3	in-g.	Gearset
Beck 1-ton.	1 1,650	34x3	34x5	1 1,650	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Beck A.	1 1,850	34x3	34x5	1 1,850	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Beck B.	1 2,050	34x3	34x5	1 2,050	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Beck C.	2 2,450	36x4	36x7	1 2,450	36x4	36x7	4-3 1/2x3	in-g.	Gearset
Bell O.	1 1,150	31x4	31x4	1 1,150	31x4	31x4	4-3 1/2x3	in-g.	Gearset
Bell O.	1 1,850	34x3	34x5	1 1,850	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Bentley AA.	1 1,950	33x4	30x5	1 1,950	33x4	30x5	4-3 1/2x3	in-g.	Gearset
Bentley BB.	1 1,600	34x3	34x5	1 1,600	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Bessmerton G.	1 1,600	34x3	34x5	1 1,600	34x3	34x5	4-3 1/2x3	in-g.	Gearset
Bessmerton H-2.	1 2,755	36x4	36x10	1 2,755	36x4	36x10	4-3 1/2x3	in-g.	Gearset
Bessmerton K-2.	4 1,459	34x4	34x6	1 1,459	34x4	34x6	4-3 1/2x3	in-g.	Gearset
Bethlehem DG.	1 2,495	34x4	34x6	1 2,495	34x4	34x6	4-3 1/2x3	in-g.	Gearset
Bethlehem EM.	3 3,595	34x4	34x6	1 3,595	34x4	34x6	4-3 1/2x3	in-g.	Gearset
Bethlehem EM.	2 2,700	36x4	36x7	1 2,700	36x4	36x7	4-3 1/2x3	in-g.	Gearset
Bell.	1 1,650	36x52	36x8	1 1,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 1,850	36x52	36x8	1 1,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 2,050	36x52	36x8	1 2,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 2,450	36x52	36x8	1 2,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 2,755	36x52	36x8	1 2,755	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 3,050	36x52	36x8	1 3,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 3,450	36x52	36x8	1 3,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 3,850	36x52	36x8	1 3,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 4,250	36x52	36x8	1 4,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 4,650	36x52	36x8	1 4,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 5,050	36x52	36x8	1 5,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 5,450	36x52	36x8	1 5,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 5,850	36x52	36x8	1 5,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 6,250	36x52	36x8	1 6,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 6,650	36x52	36x8	1 6,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 7,050	36x52	36x8	1 7,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 7,450	36x52	36x8	1 7,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 7,850	36x52	36x8	1 7,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 8,250	36x52	36x8	1 8,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 8,650	36x52	36x8	1 8,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 9,050	36x52	36x8	1 9,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 9,450	36x52	36x8	1 9,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 9,850	36x52	36x8	1 9,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 10,250	36x52	36x8	1 10,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 10,650	36x52	36x8	1 10,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 11,050	36x52	36x8	1 11,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 11,450	36x52	36x8	1 11,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 11,850	36x52	36x8	1 11,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 12,250	36x52	36x8	1 12,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 12,650	36x52	36x8	1 12,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 13,050	36x52	36x8	1 13,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 13,450	36x52	36x8	1 13,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 13,850	36x52	36x8	1 13,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 14,250	36x52	36x8	1 14,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 14,650	36x52	36x8	1 14,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 15,050	36x52	36x8	1 15,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 15,450	36x52	36x8	1 15,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 15,850	36x52	36x8	1 15,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 16,250	36x52	36x8	1 16,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 16,650	36x52	36x8	1 16,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 17,050	36x52	36x8	1 17,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 17,450	36x52	36x8	1 17,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 17,850	36x52	36x8	1 17,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 18,250	36x52	36x8	1 18,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 18,650	36x52	36x8	1 18,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 19,050	36x52	36x8	1 19,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 19,450	36x52	36x8	1 19,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 19,850	36x52	36x8	1 19,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 20,250	36x52	36x8	1 20,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 20,650	36x52	36x8	1 20,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 21,050	36x52	36x8	1 21,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 21,450	36x52	36x8	1 21,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 21,850	36x52	36x8	1 21,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 22,250	36x52	36x8	1 22,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 22,650	36x52	36x8	1 22,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 23,050	36x52	36x8	1 23,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 23,450	36x52	36x8	1 23,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 23,850	36x52	36x8	1 23,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 24,250	36x52	36x8	1 24,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 24,650	36x52	36x8	1 24,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 25,050	36x52	36x8	1 25,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 25,450	36x52	36x8	1 25,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 25,850	36x52	36x8	1 25,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 26,250	36x52	36x8	1 26,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 26,650	36x52	36x8	1 26,650	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 27,050	36x52	36x8	1 27,050	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 27,450	36x52	36x8	1 27,450	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 27,850	36x52	36x8	1 27,850	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 28,250	36x52	36x8	1 28,250	36x52	36x8	4-3 1/2x3	in-g.	Gearset
Bell.	1 28,								

Motor Age Monthly Guide to Truck Specifications—Continued

These tables are revised and brought up to date monthly.

These tables are revised and brought up to date.

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	No. Cyl. Front and Rear	No. Cyl. Front and Rear	Electric Lighting	Enginetrion	Front Tires	Rear Tires	Name and Model	Axle	Steering Gear	
Master W.	2½	3,000	34x4	36x7	Buda	4-4½x5½	Eise.	opt.	B-Lipe	B-Lipe	Mast.	Timkn.	Timkn.	
Master A.	5½	4,190	36x6	40x5d	Buda	4-4x6	Eise.	opt.	B-Lipe	B-Lipe	Mast.	Timkn.	Timkn.	
Master B.	6	5,290	36x6	40x6d	Buda	4-4x6	Eise.	opt.	B-Lipe	B-Lipe	Mast.	Timkn.	Timkn.	
Master Trac. T.	13	3,050	34x4	36x4d	Own	4-3½x4½	Eise.	opt.	B-Lipe	B-Lipe	Mast.	Timkn.	Timkn.	
Maxwell.	13	1,322	32x3	32x4	Own	4-3½x4½	Eise.	opt.	B-Lipe	B-Lipe	Mast.	Timkn.	Timkn.	
Menominee.	1	2,080	34x2½	36x5	Wis.	4-3½x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Hurleytown.	1	2,725	34x2½	36x5	Wis.	4-4x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Menominee H.	11	3,245	30x4	36x4d	Wis.	4-4x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Menominee D.	2	4,220	30x5	36x6d	Cont.	4-4½x5½	Eise.	opt.	B-Lipe	B-Lipe	Cotta.	Mon.	Mon.	
Menominee G.	31	5,450	36x6	40x6d	Buda	4-4x6	Eise.	opt.	B-Lipe	B-Lipe	Miller.	Miller.	Miller.	
Menominee J.	5	5,450	36x6	36x4d	Own	4-4x6	Eise.	opt.	B-Lipe	B-Lipe	Miller.	Miller.	Miller.	
Moreland 18-B.	1½	2,580	30x3½	36x7	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Miller.	Miller.	Miller.	
Moreland 18-C.	2½	3,775	30x4	36x7	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Miller.	Miller.	Miller.	
Moreland 18-G.	2½	4,875	31x5	40x6d	Cont.	4-4½x6	Eise.	opt.	Mon.	Mon.	Miller.	Miller.	Miller.	
Moreland 19-J.	5	5,350	31x5	40x6d	Cont.	4-4½x6	Eise.	opt.	Mon.	Mon.	Miller.	Miller.	Miller.	
Muskogee 20.	2	2,325	31x4	36x6d	Cont.	4-4½x5½	Eise.	opt.	Dixie.	Dixie.	Dixie.	Dixie.	Dixie.	
Mutual.	3½	3,450	36x4	36x8	Wis.	4-4x5	Eise.	opt.	Dixie.	Dixie.	Dixie.	Dixie.	Dixie.	
Mutual.	5	3,630	36x5	36x8	Wis.	4-4½x5½	Eise.	opt.	Dixie.	Dixie.	Dixie.	Dixie.	Dixie.	
Napoleon 9.	1	1,155	32x3½	32x4	Gray	4-3½x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Napoleon 11.	1½	1,785	34x4	34x3	Gray	4-3½x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Napoleon 2018.	2	2,935	34x4	34x3	Gray	4-3½x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Nash 2018.	2	2,935	34x4	34x3	Gray	4-3½x5	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Nash 4017.	2	2,250	34x5	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Nelson & LeM. F.	1	2,250	36x3½	36x4	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Nelson & LeM. F3.	2	3,630	36x4	36x5d	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Nelson & LeM. FC5.	5	4,045	36x5d	36x6d	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Nisco. D.	2	3,100	36x4	36x6	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Niles.	2½	3,500	30x4	36x7	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Noble. A-20.	1	2,000	1½	36x3½	36x4	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.
Noble. B-30.	1½	2,000	1½	36x3½	36x4	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.
Noble. C-40.	2	3,630	36x4	36x5d	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
Noble. D-50.	2½	4,045	36x5d	36x6d	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	1½	2,300	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	2	2,300	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	2½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	3½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	4½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	5½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	6½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	7½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	8½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	9½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	10½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	11½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	12½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	13½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	14½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	15½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	16½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	17½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	18½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	19½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	20½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	21½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	22½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	23½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	24½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	25½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	26½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	27½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	28½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	29½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	30½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	31½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	32½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	33½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	34½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	35½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	36½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	37½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	38½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	39½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	40½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	41½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	42½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	43½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	44½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	45½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	46½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	47½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	48½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	49½	3,200	30x4	36x5	Cont.	4-4½x5½	Eise.	opt.	Mon.	Mon.	Mon.	Mon.	Mon.	
O.K.	50½	3												

Motor Age Monthly Guide to Truck Specifications—Concluded

These tables are revised and brought up to date monthly.

These tables are revised and brought up to date.

**DON'T REPAIR TIRES IN YOUR
SALESROOM**

(Concluded from page 14)

(Continued from page 1)

dent that this scheme will inevitably result in bringing considerable business to the establishment. Furthermore, an electric searchlight is being installed on the roof of the building, and at night this light will throw its beams high into the air, attracting the attention of motorists all over the city and in the country districts, and constantly calling their attention to the store's existence. It is expected that this novel plan will create a great amount of comment, and that from this word-of-mouth advertising the store will receive a very considerable amount of increased business.

The belief of the management that

It is the belief of the management that most purchasers of tires like to see the tire unwrapped before buying it. "They like to pinch it, feel it and turn it around to see whether or not they can discover any flaws in it," said Mr. Law. "Consequently we are catering to that desire on the part of motorists by installing in our storeroom a number of tires on wheels to which handles have been attached so that purchasers can for themselves; turn the tires over and look at them carefully. And they can pinch the tires to their heart's content and make any other little investigations of the tires that they desire to make. We are installing all the popular sizes on wheels in the salesroom—Fords, Overlands and Buicks. Then on the counter at the rear of the salesroom we have cross sections of tires and tubes which customers are free to finger as much as they want. We find that this service is much appreciated by customers, particularly by the women.

"Most women are unfamiliar with the processes of tire manufacture. It is surprising and interesting to most of them to see the various layers of materials in a tire as shown in a cross section and they like to pick up sections of tubes and see just what they are like. When they can turn tires around on the wheels and look at cross sections and samples the more interest in our product, talk about it to other people and feel more confidence in our goods. Of course we can't get all these desirable results by simply showing tubes and tires in original packages and that's the reason why we have adopted this plan."

To add interest to the salesroom, numerous framed pictures of the company's plant have been placed on the walls. It is the belief of the management that people nowadays are particularly interested in photographs and pictures and that this use of photos will tend to create greater interest on the part of customers in the plant and in the store. This plan of extensively using pictures is also carried out in the "Illustrated News," a house organ of the manufacturing company, which is given free to every patron of the store. In this publication appear photos of the various departments of the plant at work, the annual meeting of the company's stockholders, etc.

PISTON RING SIZES

of Cars From 1916 to 1920

Motor Age Maintenance Data Sheet No. 100

One of a series of weekly pages of information valuable to service men and dealers—save this page

(Continued from last week)

Car and Model	Rings per Piston	Ring Diam-eter	Ring Width	Car and Model	Rings per Piston	Ring Diam-eter	Ring Width	Car and Model	Rings per Piston	Ring Diam-eter	Ring Width
Sun, All	3	3 1/8	3/16	Maibohm, B	2	3 1/4	3/16	Chalmers, 6-30	3	3 1/4	3/16
Templar, 445	4	3 3/8	3/16	Marmon, 34	3	3 3/4	3/16	Champion, K	3	3 1/2	3/16
Velie, 27	3	3 1/2	3/16	Maxwell, 25	3	3 5/8	3/16	Chandler	3	3 1/2	3/16
Velie, 28	3	3 1/4	3/16	McFarlan, X	5	4 1/2	1/4	Chevrolet, D.	3	3 3/8	3/16
Westcott, S-17	3	3 1/2	3/16	Mercer	3	3 3/4	3/16	Chevrolet, 490 & FB	3	3 11/16	3/16
White	3	4 1/4	1/4	Metz, 25	3	3 7/8	3/16	Cleveland, 40	3	3	3/16
Willys-Knight, 88-4-2-4	4	4 1/8	3/8	Mitchell, C.	-	3 1/2	3/16	Climber, T-4-40	3	3 1/2	3/16
Willys-Knight, 88-8	3	3 3/8	3/16	Mitchell, D.	-	3 1/4	3/16	Cole, 870	4	3 1/2	3/16
Winton, 22	3	4 1/2	1/4	Moline-Knight, L.	3	3 3/4	3/16	Columbia, F & G	3	3 1/4	3/16
Winton, 22A	3	3 3/4	1/4	Monitor, C	3	3 3/4	3/16	Comet, C-52 & 53	3	3 1/2	3/16
				Monitor, M.	3	3 1/4	3/16	Commonwealth, 4-40	3	3 1/2	3/16
				Monroe, M6	3	3 1/4	3/16	Crawford, All	3	3 1/2	3/16
				Moon, 6-36	3	2 7/8	3/16	Crow-Elkhart, K-32			
				Moon, 6-66	3	3 1/2	3/16	& 34	3	3 1/2	3/16
				Moore, C	3	3 25/32	3/16	Crow-Elkhart, H-36	3	3 1/8	3/16
				Murray	3	3 1/4	3/16	Cunningham, V-3	3	3 3/4	3/16
				Nash, 681, 2, 3, 4 & 5	3	3 1/4	3/16	Daniels	3	3 1/4	3/16
				National	3	3 1/2	3/16	Davis, H, I, L, N & P	3	3 1/4	3/16
				National	4	2 7/8	3/16	Davis, J & M	3	3 1/2	3/16
				Nelson, C	2	3 1/8	3/16	Dixie Flyer, H-S50	3	3 1/4	3/16
				Oakland, 34-B	3	2 13/16	3/16	Dodge Brothers	3	3 7/8	3/16
				Oldsmobile, 37	3	2 13/16	3/16	Dorris, 6-80	3	4	1/4
				Oldsmobile, 45-A	4	2 7/8	3/16	Dort, 11	3	3 1/2	3/16
				Olympian	3	3 1/4	3/16	du Pont, A.	3	3 15/16	3/16
				Overland, 88-4	3	4 1/8	3/8	Economy, 16-46	3	3 1/4	3/16
				Overland, 88-81	3	3 3/8	3/16	Elcar, D-4	3	3 1/2	3/16
				Overland, 90 & 90-B	4	3 3/8	3/16	Elcar, D-6	3	3 1/4	3/16
				Overland, 85-4	2	4 1/8	3/8	Elgin, H	3	3 1/8	3/16
				Owen Magnetic, O-36	3	3 3/4	3/16	Essex, A	3	3 3/8	3/16
				Owen Magnetic, W-42	3	4	1/4	Ford, T	3	3 39/64	1/4
				Packard, 325 & 335	3	3	3/16	Franklin, Series 9	3	3 1/4	3/16
				Paige, M	3	3 1/2	3/16	Geronimo, 6-A-45	3	3 1/8	5/32
				Paige, P	3	3 1/8	1/8	Glide, 6-40	3	3 1/8	5/32
				Paterson, 6-46	3	3 1/4	3/16	Grant, GX	3	3 1/8	3/16
				Pathfinder	3	2 7/8	3/16	Hackett	4	3 3/4	3/16
				Peerless, 56, Series 4	3	3 1/4	3/16	Hanson, A-45	3	3 1/4	3/16
				Pennsy, 418	3	3 3/4	3/16	Harroun	3	3 248	1/4
				Pennsy, 6-21	3	3 1/4	3/16	Haynes, 45	2	3 1/2	1/4
				Phiaanna, M	3	3 29/32	5/16	Haynes, 46	2	2 3/4	1/4
				Piedmont, 4-30	3	3 1/2	3/16	Hollier	3	3 1/4	3/16
				Piedmont, 6-40	3	3 1/4	3/16	Holmes	3	3 1/2	3/16
				Pierce-Arrow, 38, C4	3	4	1/4	Hudson	3	3 1/2	3/16
				Pierce-Arrow, 48 - B				Hupmobile, R.	3	3 1/4	3/16
				Pierce-Arrow, 48 - B				Jackson	3	3	3/16
				Pierce-Arrow, 66-A4	3	5	1/4	Jones, 28	3	3 1/2	3/16
				Pilot, 6-45	4	3 1/8	9/32	Jordan, B.	3	3 1/2	3/16
				Premier, 6-C	3	3 3/4	3/16	King, G	3	3	3/16
				Regal, J	3	3 1/2	3/16	Kissel, 4-32	3	3 7/8	3/16
				Reo, T & U	3	4 1/8	3/16	Kissel, 4-36	3	4 1/4	3/16
				Richmond	3	3 1/2	3/16	Kissel, Custom Built	4	3 5/16	3/16
				Roamer, 6-54	3	3 1/2	3/16	Klinekar, 6-42-H	3	3 1/4	3/16
				Ross	3	3 1/4	3/16	Leach	3	3 1/2	3/16
				Sayers, A	2	3 1/4	1/4	Lexington, 6-R	3	3 1/4	3/16
				Scripps-Booth, G	3	3 11/16	1/4	Locomobile, M.	3	4 1/2	1/4
				Standard, G	3	3 1/4	3/16	Lorraine	3	3 1/2	3/16
				Seneca, D	3	3 1/8	3/16	Maibohm, B	2	3 1/8	3/16
				Shad Wyck	3	3 1/2	3/16	Marmon, 34	4	3 3/4	3/16
				Singer, 18	3	4	3/16	Maxwell, 25	3	3 5/8	3/16
				Saulding	3	3 3/4	1/4	McFarlan, X	5	4 1/2	1/4
				Standard	3	3 1/4	3/16	Mercer, Series 5	3	3 3/4	3/16
				States, C-18	3	3	1/4	Meteo, R.	3	4 1/4	1/4
				Stearns, SKL4	3	3 3/4	3/16	Mitchell, E-40	3	3 1/4	3/16
				Stearns, SK8	3	3 1/4	3/16	Mitchell, E-42	3	3 1/2	3/16
				Stephens, 80	3	3 1/4	3/16	Moline-Knight, L.	3	3 3/4	3/16
				Studebaker, ED-6	4	3 7/8	3/16	Nash, 681, 2, 4, 5, 6 & 7	3	3 1/4	3/16
				Studebaker, SF-4	4	3 7/8	3/16	National, AM	4	2 7/8	3/16
				Stutz, S	2	4 3/8	1/4	Nelson	2	3 1/8	3/16
				Templar, 445	4	3 3/8	3/16	Oakland, 34-B	3	2 13/16	3/16
				Tulsa, D1	3	3 1/2	3/16	Oldsmobile, T	4	3 11/16	3/16
				Velie, 38	3	3 1/4	3/16	Oldsmobile, 37-A	4	2 18/16	3/16
				Velie, 39	3	3 1/2	3/16	Oldsmobile	4	2 7/8	3/16
				Westcott, S-18	3	3 1/2	3/16	Overland, 90 & 90B	4	3 3/4	3/16
				Willys-Knight, 88-4-2-4	4	1 1/8	3/8	Owen Magnetic, W-42	3	4	1/4
				Willys-Knight, 88-8-3	3	3 3/8	3/16	Packard, 325 & 335	4	3	3/16
				Winton, 22	3	4 1/2	1/4	Paige, 6-55	3	3 1/2	3/16
				Winton, 22-A	3	3 3/4	1/4	Paige, 6-39	3	3 1/8	5/32
								Paterson, 6-47	3	3 1/4	3/16
								Peerless, 56, Series 5	3	3 1/4	3/16
								Phiaanna, R.	3	3 29/32	5/16
								Piedmont, 4-30	3	3 1/2	3/16
								Piedmont, 6-40	3	3 1/4	3/16
								Pierce-Arrow, 38-C4	3	4	1/4
								Pierce-Arrow, 48-B4			
								& B5	3	4 1/2	1/4
								Pilot, 6-45	4	3 1/8	3/16
								Porter, 45-B	..	4 39/64	1/4
								Premier, 6-C	3	3 3/8	3/16
								Reo, T	3	4 22	3/16
								Revere, B & C	3	4 3/8	1/2

(To be continued next week)

From the Four Winds

Glimpses at the World of Motordom

Coming Motor Events

AUTOMOBILE SHOWS

Indianapolis.....	Fall Automobile Show.....	Sept. 6-11
Northampton, Mass.....	Annual Automobile Show.....	Oct. 6-8

FOREIGN SHOWS

Antwerp.....	Cars, Tires, Wheels, Parts and Equipment.....	May 15-June 13
Antwerp.....	Commercial Vehicles, Tractors, Trucks and Engines.....	June 26-July 25
London.....	Commercial Vehicles, Exhibition, Olympia.....	October
London.....	Passenger Car Show, Olympia.....	November

CONVENTIONS

Charleston, S. C.....	South Carolina Automotive Trade Assn.....	June 24-25
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RACES

Uniontown, Pa.....	Speedway Race.....	June 12
Portland, Ore.....	Dirt Track.....	June 17
Chicago, Ill.....	Inter Club Run.....	June 17-18
Ogdensburg, N. Y.....	Dirt Track.....	June 19
Hanford, Cal.....	Dirt Track.....	July 4
Spokane, Wash.....	Dirt Track.....	July 4
Tacoma, Wash.....	Speedway Race.....	July 5
Batavia, N. Y.....	Dirt Track.....	July 5
Warren, Pa.....	Dirt Track.....	July 17
Watertown, N. Y.....	Dirt Track.....	July 24
Fulton, N. Y.....	Dirt Track.....	July 31
Paris, France.....	Grand Prix Race, Sporting Commission.....	August
Erie, Pa.....	Dirt Track.....	Aug. 7
Buffalo, N. Y.....	Dirt Track.....	Aug. 14
Johnstown City, Pa.....	Dirt Track.....	Aug. 21
Elgin, Ill.....	Road Race.....	Aug. 21
Middletown, N. Y.....	Dirt Track.....	Aug. 20-21
Flemington, N. J.....	Dirt Track.....	Aug. 27-28
Canandaigua, N. Y.....	Dirt Track.....	Aug. 28
Hornell, N. Y.....	Dirt Track.....	Sept. 6
Uniontown, Pa.....	Speedway Race.....	Sept. 6
Syracuse, N. Y.....	Dirt Track.....	Sept. 17-18
Allentown, Pa.....	Dirt Track.....	Sept. 25

TOURS

Omaha, Neb.....	Truck Reliability Run.....	June 14
Milwaukee, Wis.....	Wisconsin Truck Tour, Milwaukee Sentinel.....	June 21-26
Lake Huron Tour.....	Michigan Pikes Assn.....	July 4
New York-San Francisco.....	Glidden Tour.....	September
Milwaukee, Wis.....	Annual Fall Automobile Show.....	Aug. 30-Sept. 4

Canada Ships Plugs to England—It is significant of the steps being taken to readjust the badly distorted balance of trade between Canada and England, that Canadian spark plugs are now being shipped to England for the first time. A large Canadian company has just made its initial shipment of spark plugs, thereby establishing a precedent in the fact that a Canadian manufacturer is shipping into a field which formerly supplied this country, rather than looking to Canada for its supplies.

Houses Must Not Be Moved on Roads—With a view to making suitable representations to the Quebec legislature at its next session, the legislation committee of the Automobile Club of Canada is taking up the matter of the blocking of traffic and the damage to road surfaces by the practice of moving houses long distances along the highways. The issue is raised by a recent example at Yamachiche, where much inconvenience was caused to road travelers by the moving

of a house. About two years ago a similar case occurred on the King Edward Highway, when for several days a house in process of removal was allowed to remain in the road, practically cutting off all traffic. At present the Roads Department of the province has no control over such an abuse of the highways.

Winnipeg Has Car for Every 15 Persons—Winnipeg is making headway in its motorization, 17,351 cars having been chalked up to date, according to the latest figures of the automobile license department, which is approximately a car to every fifteen persons, basing the figures on a population of 262,000.

Put First Automobile in Museum—The first automobile ever constructed in the province of Quebec will be added to the collection of relics in possession of the Chateau de Rampepa. This machine, which was manufactured under the enterprise of J. H. Dandurand and William Jennings and his father in 1895, was offered to the society by Mr. Dandurand in a communication received, the offer being accepted with thanks. The machine will be installed in the basement museum.

Massachusetts Increases License Fees—Increasing the fees in Massachusetts for registering motorcycles from \$2 to \$5, and for all automobiles having less than 30-horsepower from \$5 to \$10, is one of the measures Governor Coolidge has just signed.



HORSE-DRAWN VEHICLE GIVES WAY TO ELECTRIC BUS

For something like fifty years the Parmelee hack has been a familiar conveyance around Chicago depots. It has been used for transporting passengers from one depot to another and during that long period of service they have carried some of the most important people of the United States who passed through Chicago. They have relied on the horse during all this time but at last had to give way to modern methods and have installed electric buses to replace the old horse drawn vehicles.